AT&T Bell Laboratories

Certification Report for Closure of the Concentrated Waste Storage Tank System

February 1992

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Vernon Hills, Illinois

CERTIFICATION REPORT
FOR
CLOSURE OF THE CONCENTRATED WASTE STORAGE TANK SYSTEM

Prepared for

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Naperville, Illinois 60566

Submitted to

Illinois Environmental Protection Agency
Springfield, Illinois

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February 1992

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SECTION 1

INTRODUCTION

This report is being submitted in compliance with Section II (Tank Systems) of the Hazardous Waste Management RCRA Part B Permit for the AT&T Bell Laboratories-Indian Hill Facility located in Naperville, Illinois (LPC# 0438050004, IL068608314, Part B Permit Log No. 107) and presents the information required in Item K.8.-Closure (page II-7) of the permit. The existing Concentrated Waste Storage Tank System (CWSTS) was renovated based on plans and specifications prepared by Camp Dresser & McKee Inc. (CDM) in Chicago, Illinois and submitted to AT&T Bell Laboratories in January 1990 and on specifications for environmental engineering management services prepared by AT&T (Project No. 190380F, 1/19/90). This report presents documentation and a certification statement (Attachment C-1 of the permit) necessary to demonstrate that closure of the existing CWSTS was conducted in accordance with the approved plans and specifications.

This report contains four sections as described below:

<u>INTRODUCTION</u> - This section presents the scope and purpose of the project.

<u>DESCRIPTION OF CLOSURE</u> - This section presents a description of activities associated with closure of the existing CWSTS.

<u>PC SHOP CLEANUP</u> - This section presents a description of closure activities conducted during the PC Shop cleanup.

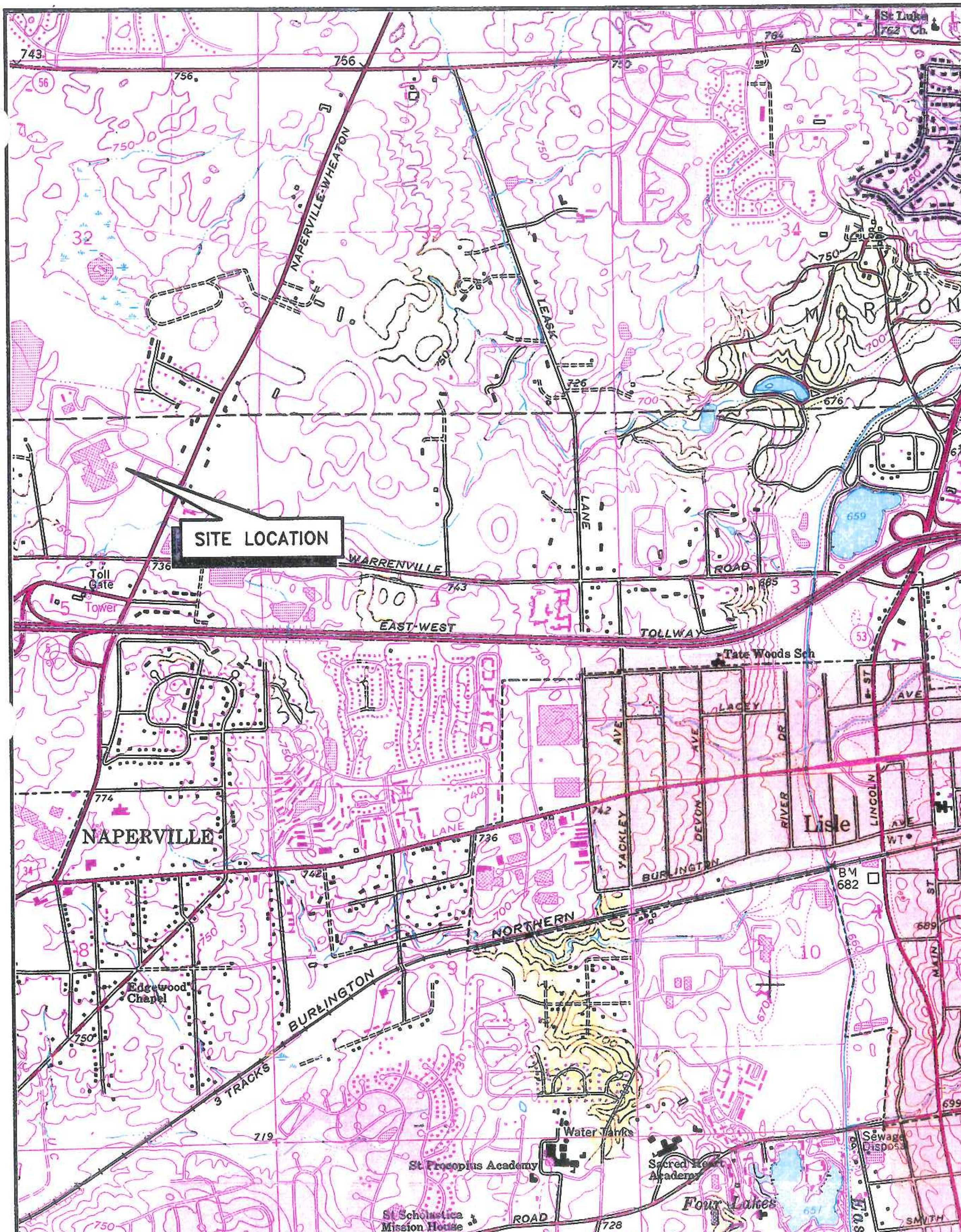
<u>CERTIFICATION</u> - This section presents documentation that certifies that closure of the existing CWSTS was conducted as required by the Permit; and plans and specifications.

1.1 FACILITY DESCRIPTION

The AT&T Bell Laboratories Indian Hill Facility (AT&T) is located within the Office, Research and Light Industry; and Research and Development zoning areas of Naperville, DuPage County, Illinois (Figure 1-1). The facility occupies approximately 195 acres and consists of a main building, which includes
service building, a vaulted CWST, containe
building, and a stormwater detention basin (Figure 1-2). Surrounding land use include residential developments, forest preserves, and commercial and industrial uses.

Acre

The AT&T facility is engaged in communications-related research and development as a primary activity. Additional activities include both office support and service functions. The facility currently employs approximately 4,100 personnel.



WESTON MANAGERS DESIGNERS/CONSULTANTS	Three Hawthorn Parkway Vernon Hills, Illinois 60061	FIGURE 1-1	AREA LOCATION MAP AT & T BELL LABS Naperville, Illinois

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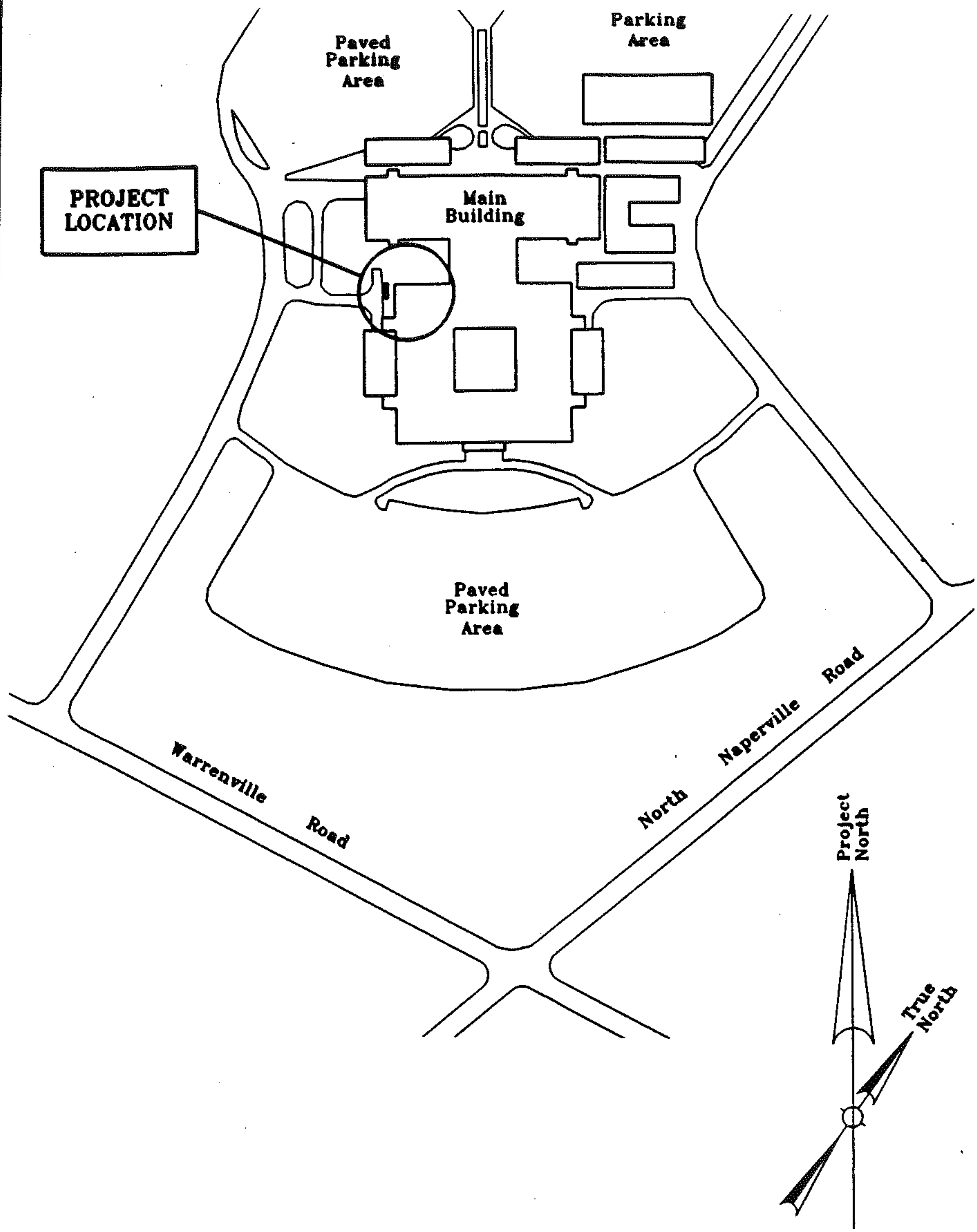

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Vernon Hills, Illinois
60061

FIGURE
1-2

SITE LOCATION MAP

AT & T BELL LABS
Naperville, Illinois

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1.2 CWSTS DESCRIPTION

The CWSTS is used to collect and store wastewater generated during printed circuit (PC) board fabrication in the PC Shop and from the Thin Films Coating Laboratory. The major volume of waste managed by the CWSTS meets the RCRA definition of corrosivity when introduced into the system. However, through dilution and neutralization, the contents of the CWST exhibit the characteristics of an Illinois special waste. By volume, most of the corrosive waste discharged into the CWSTS is spent caustic developer baths, spent acid etchant, spent ammonia etchant, electroless copper baths, acid baths, and rinse water from the PC Shop.

1.2.1 Existing CWSTS

The existing CWSTS consists of two separate waste lines (Figure 1-3). A 4-inch single-wall polypropylene pipeline conveying waste, via a gravity feed system, from the Section 2 Thin Films Coating Laboratory and PC Shop to the concentrated waste storage tank (CWST). A non-operational waste line, also a 4-inch single-wall polypropylene pipeline, conveyed similar waste from a now defunct laboratory in Section 6 to the CWST. The existing CWST is a single-wall 6,000-gallon steel tank with interior and exterior protective coatings. The vault is constructed of high density concrete with 12-inch walls and floors. The vault floor is sloped so leakage can be collected. The vault is equipped with a sump, emergency shower, and stairwell.

1.2.2 Renovated CWSTS

The renovated CWSTS consists of a 6,000-gallon two-compartment double-wall steel tank with an interior chemical resistant coating, a rehabilitated CWST vault, two double-wall polypropylene waste lines, a leak detection system, and a concrete trench that contains the double-wall waste lines. The waste lines originate in the Section 2 Thin Films Coating Laboratory and the PC Shop (Figure 1-3). The renovated CWST allows for waste segregation with a 4x8 inch double-wall polypropylene pipe (main waste line) conveying PC Shop waste, via a gravity feed system, to the 4,000-gallon compartment of the new CWST. A 3x6-inch double-wall polypropylene pipe (copper waste line), also via a gravity feed system, conveys the recoverable copper waste from the Thin Films Coating Laboratory to the 2,000-gallon compartment of the new CWST.

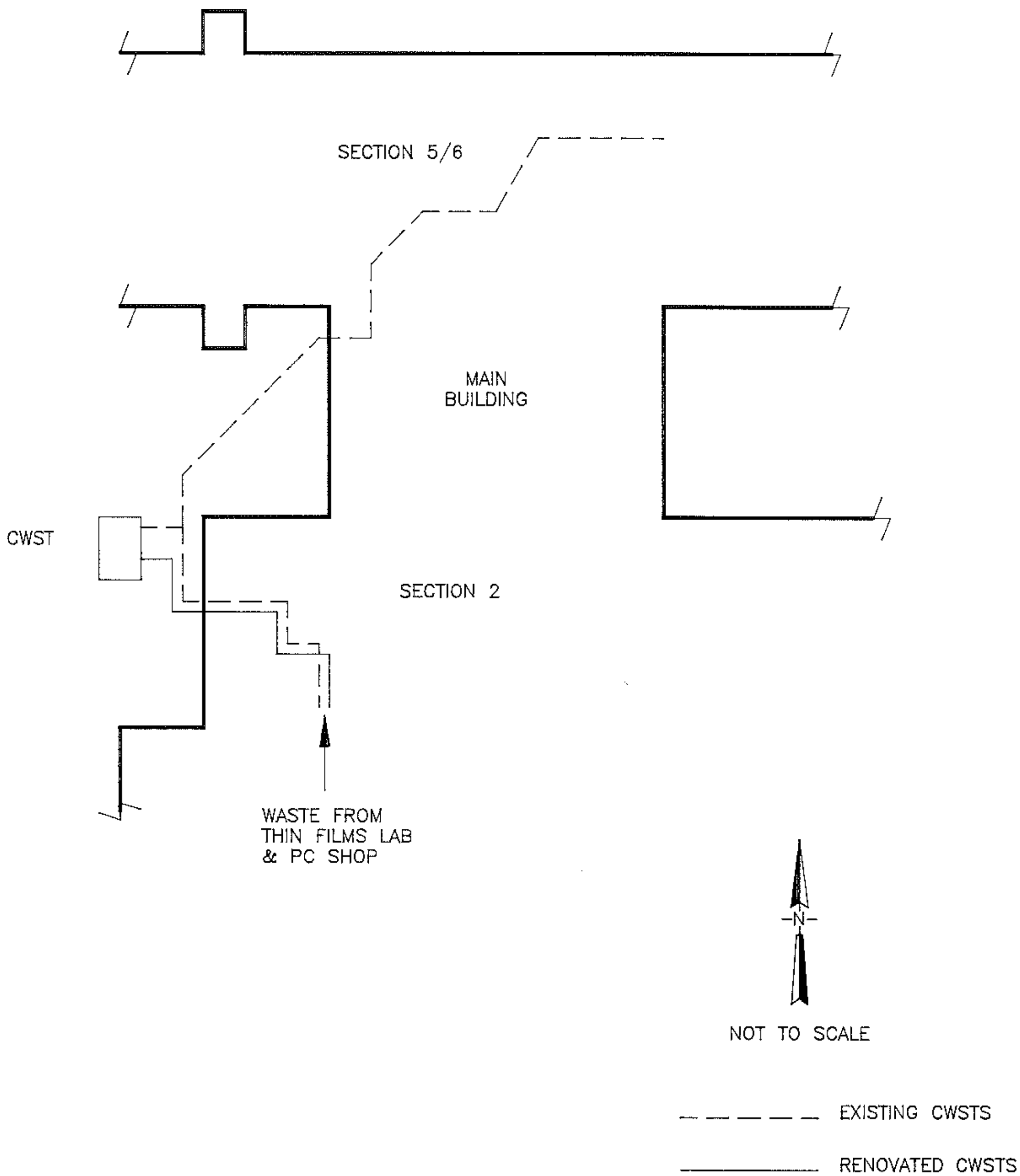

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FIGURE 1-3

EXISTING & RENOVATED CWSTS

AT&T BELL LABORATORIES
Naperville, Illinois

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SECTION 2

DESCRIPTION OF CLOSURE

This section presents a detailed description of all CWSTS closure activities, at the AT&T facility except for PC Shop closure activities which are presented in Section 3. Renovation of the CWSTS included the following tasks:

- Decontamination, removal, and disposal of the exposed CWSTS piping.
- Decontamination and capping of below-grade piping.
- Decontamination, removal, and disposal of existing CWST and vault piping.
- Decontamination rinse water sampling and analysis.
- Soil sampling and analysis.
- PC Shop cleanup.

2.1 CLOSURE ACTIVITIES

Closure activities at the site began on 3 April 1990 and were completed on 26 December 1991, as shown in Table 2-1. This section describes all on-site closure activities conducted during this period. Photographic documentation of the closure is provided in Appendix A.

2.1.1 Decontamination, Removal and Disposal of Exposed CWST Piping

The decontamination procedure, as stated in the CWSTS Environmental Engineering Management Services specifications, involved rinsing CWSTS piping with copious amounts (approximately 50 to 100 gallons) of tap water. All exposed CWSTS piping was decontaminated according to the specifications, cut, wrapped in plastic, and staged in a roll-off box for disposal. CWSTS piping decontamination and removal were conducted in Service Cores No. 1 and No. 2 (Figure 2-1).

Service Core No. 1 consists of three separate service cores extending vertically from the first floor to the Thin Films Coating Laboratory on the third floor. On 9 April 1990, three acid drains, located in the Thin Films Coating Laboratory, were rinsed with tap water for 15 minutes. The CWSTS piping was rinsed for an additional 30 minutes to ensure proper decontamination. The CWSTS piping was removed from the Thin Films Coating Laboratory to the

TABLE 2-1

CHRONOLOGICAL SUMMARY OF CLOSURE ACTIVITIES
AT&T BELL LABORATORIES
NAPERVILLE, ILLINOIS

Closure Activity	Date(s) Performed (1990)
Pipe decontamination and removal in Service Core near thin films lab	9 April
Pipe decontamination and removal in mechanical room	12 April
Decontamination of old CWST	3 May
PC shop cleanup	10-18 May
Pipe tracing by M&M Radio Laboratories in building 5/6	31 May
Removal of old CWST from concrete vault	20 June
Cut old CWST with hydraulic shears	22 June
Pipe decontamination and removal in Service Core near PC shop	12 July
Disposal of piping and CWST at Settler's Hill Landfill, Batavia, Illinois	12 July
Decontamination of underground pipe to remain in place	4-5 August
Capping and grouting underground pipe	6-11 August
PC Shop soil disposal	26 December 1991

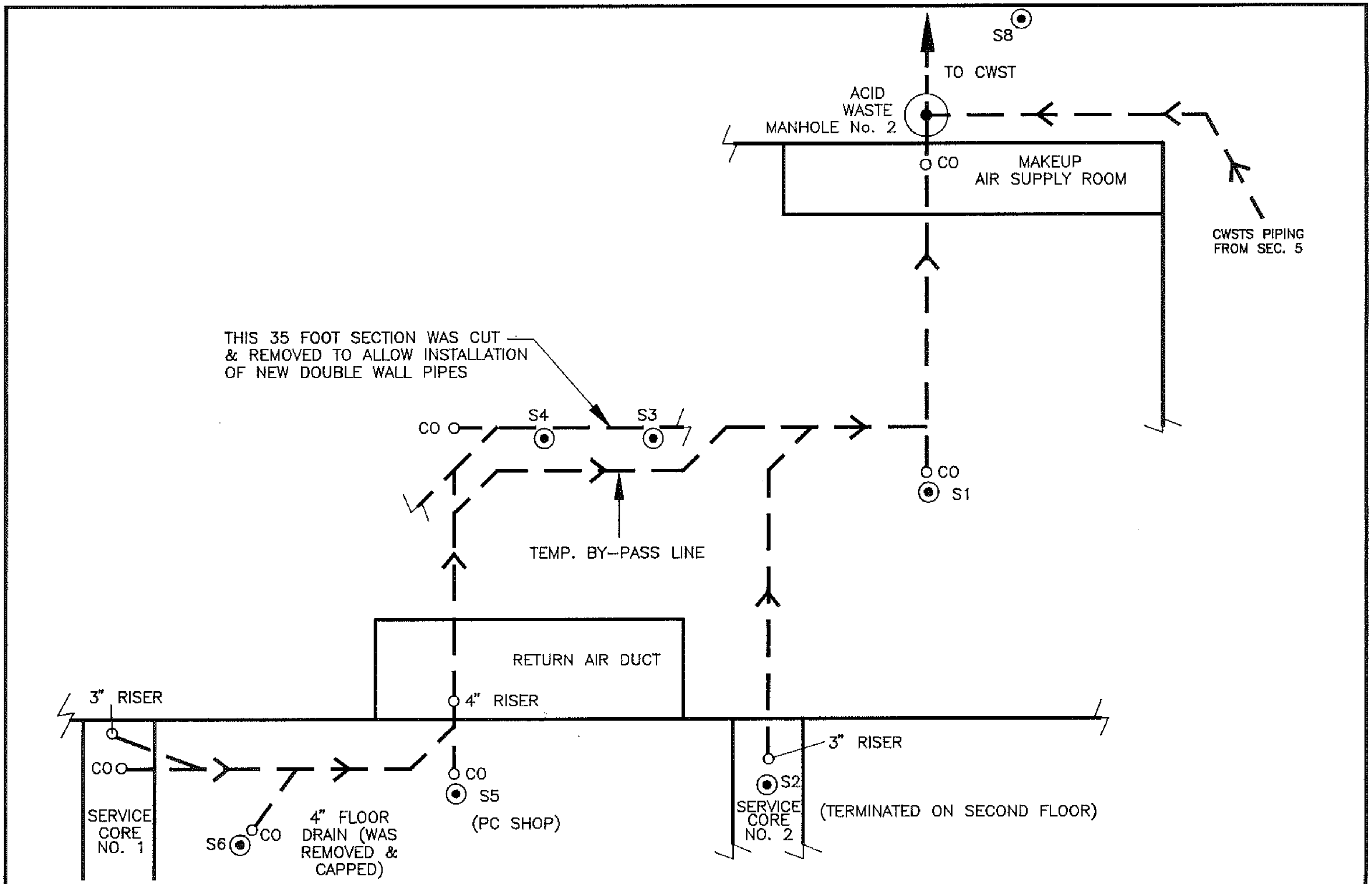

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FIGURE
2-1

CWSTS PIPING & SOIL SAMPLING
LOCATION MAP SECTION 2
AT&T BELL LABS
Naperville, Illinois

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first floor of Service Core No. 1. Two vent pipes were also removed and staged in the roll-off box for disposal.

On 12 April 1990, approximately 35 feet of 4-inch pipe was removed from Mechanical Room No. 2. The CWSTS piping was decontaminated according to the specifications when the line was rinsed on 9 April 1990. The decontaminated CWSTS piping was staged in the roll-off box for disposal.

On 12 July 1990, 20 feet of 3-inch pipe was removed between the first floor and the second floor in Service Core No. 2. The CWSTS piping was disposed of in the roll-off box which also contained the CWST, vault transfer pump, and the vault piping. See Subsection 2.1.3 for details of disposal.

2.1.2 Decontamination and Capping of Below-Grade Piping

Decontamination of the underground CWSTS piping to remain in place was performed, in accordance with the specifications, by Halliburton Industrial Services Inc. (Halliburton) on 4 and 5 August 1990. The underground pipe was pressure washed with a detergent solution and tripled rinsed with tap water. The detergent solution was premixed in a 300-gallon tank with one quart of PEN-5 (strong alcohol-based detergent) and approximately 20 pounds of trisodium phosphate (TSP). The line pressure was maintained at 3,000 to 4,000 pounds per square inch (psi) throughout the decontamination process. Due to the piping system configuration (number of turns or elbows and pressure), the pressure washing had to be conducted in sections.

A description of the decontamination procedure is as follows:

- Covered the area surrounding cleanout/riser with plastic to contain any outward water flow.

- The underground pipe in Section 5/6 was cleaned first. The short section of vertical cleanout/riser pipe was cleaned by scrubbing the pipe with a soap solution and rinsing it with tap water. This procedure was performed on all cleanouts and risers not used as entry ports for pressure washing. Specifically, the cleanout in the Makeup Air Supply Room (Figure 2-1), the 4-inch riser in the telephone closet (Figure 2-2), and the cleanout in the purchasing office (Figure 2-2).

- The direction of underground pipe decontamination was from upstream to downstream. The sequence of pressure washing in Section 5/6 was through the following cleanout/risers (Figure 2-2).

    - Cleanout and riser near sample location S18.
    - Riser near sample location S17.

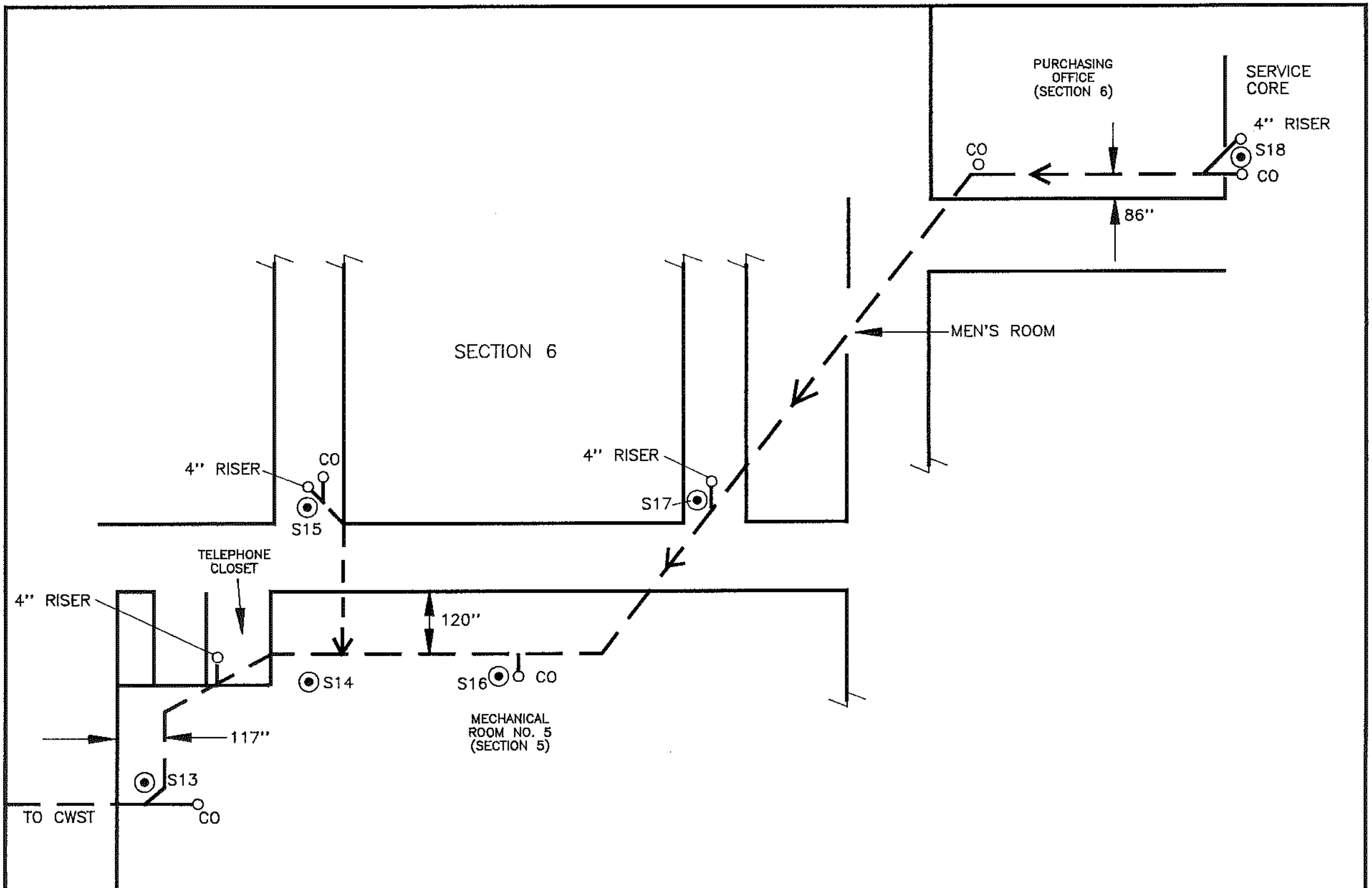

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FIGURE
2-2

CWSTS PIPING AND
SOIL SAMPLING LOCATION MAP SEC. 5/6
AT&T BELL LABS
Naperville, Illinois

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- Cleanout near sample location S16.
- Cleanout and riser near sample location S15.
- Cleanout near sample location S13.

- Water that overflowed from the cleanout/riser was immediately removed with a wet/dry vacuum cleaner and staged in 55-gallon steel drums to be pumped into the CWST.

- Mars Environmental Solutions, Inc. (MARS) also removed the debris (plastic, absorbent pad, etc.) and cleaned the floor after Halliburton finished each section of the underground pipe.

- Two access fittings were installed to pressure wash the underground pipe from the acid waste manhole located outside Section 5 to the new storage tank in the vault; one 90° 4-inch elbow in the acid waste manhole, and one 45° 4-inch elbow in the vault before entry into the new storage tank (Figure 2-3). Each access fitting included an upstream ball valve.

- Halliburton had difficulty running 200 feet of 1/2-inch pressure hose to clean the underground pipe from acid waste manhole No. 1 to the tee section near sample location S8 (Figure 2-3). A smaller size (3/8 inch) of pressure hose was used to complete the decontamination of the underground pipe.

- The last section of pipe from the tee section near location S8 to the vault was pressure washed through the access fitting in the concrete vault.

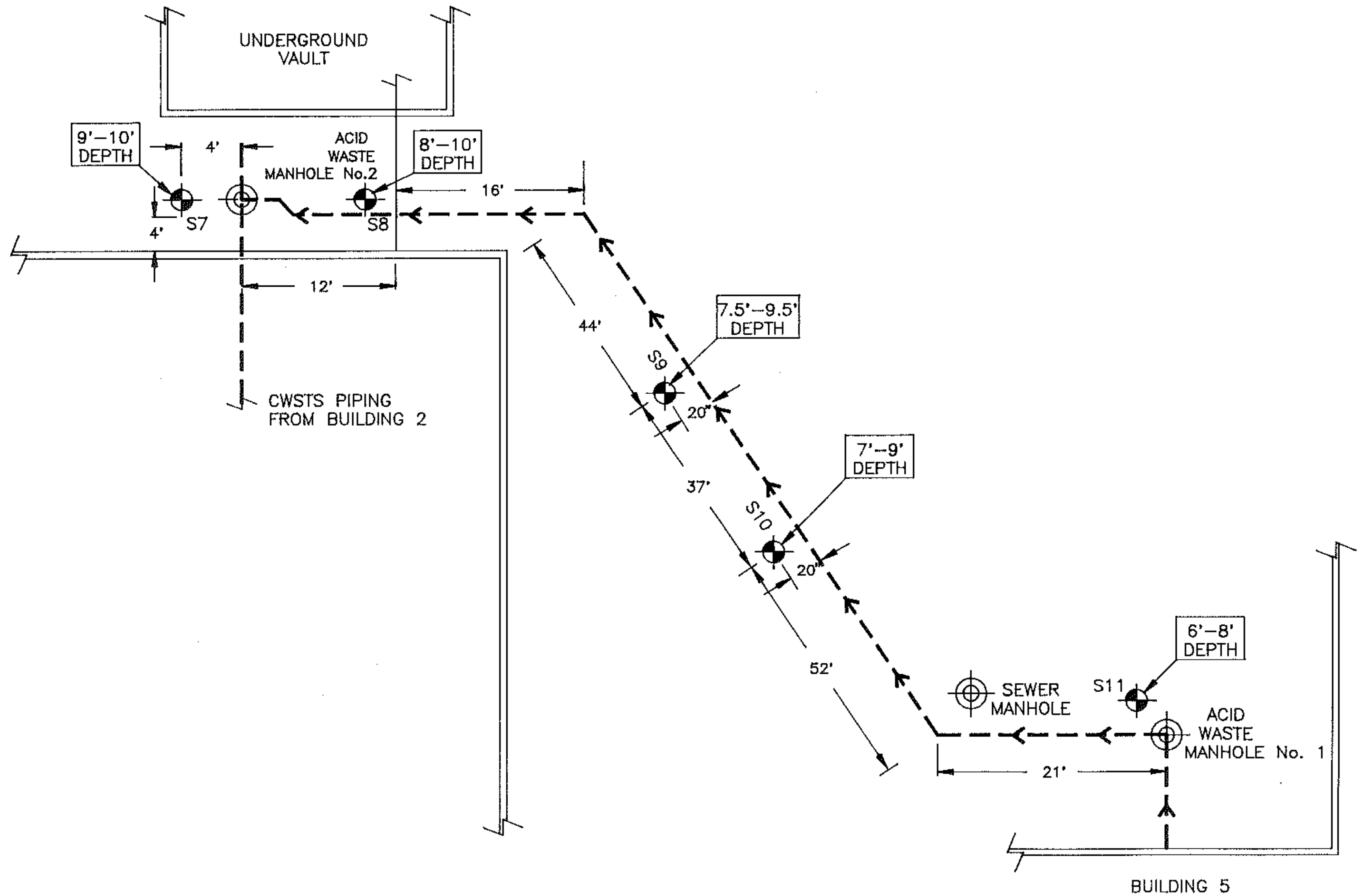
- After all sections of pipe were decontaminated, the underground pipe was rinsed with water for approximately 15 minutes through the upstream cleanout near sample location S18.

The underground pipe from Section 2 was decontaminated on 5 August 1990. In order to decontaminate the underground pipe, a temporary bypass line had to be installed to replace the 35 linear feet of pipe removed from Mechanical Room No. 2. The same decontamination procedure explained above was followed. The sequence of pressure washing of underground pipe from Section 2 was through the following cleanouts/risers (Figure 2-1).

- A 3-inch riser on the first floor of Service Core No. 1.

- A cleanout on the first floor of Service Core No. 1.

- A cleanout in the PC Shop near sample location S5.



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60061

FIGURE
2–3

CWSTS PIPING & SOIL SAMPLING
LOCATION MAP OUTSIDE OF BUILDING
AT&T BELL LABORATORIES
Naperville, IL

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- A 3-inch riser located on the first floor of Service Core No. 2.

- A 4-inch riser located in the return air duct in Mechanical Room No. 2.

- Cleanout near sample location S1.

- The last section of pipe from the tee section near sample location S8 to the concrete vault was pressure washed through the access fitting located inside the vault.

- The underground pipe was flushed with tap water for approximately 15 minutes by running water through the cleanout located in Service Core No. 1.

Cleanouts/risers not utilized as entry ports for pressure washing were decontaminated manually with brushes, a detergent solution, and a triple water rinse. The piping was decontaminated to points of access to the CWSTS underground pipe. The location of these cleanout/risers are as follows:

- A cleanout located in the makeup air supply room (Figure 2-1).

- A cleanout located in the purchasing office (Figure 2-2).

- A 4-inch riser located in the telephone closet (Figure 2-2).

The cleanout/riser locations were decontaminated prior to the decontamination of the underground CWSTS piping.

Decontamination water generated during the cleaning operation was pumped from the new double-walled two-compartment steel CWST into a 15,000-gallon frac tank for disposal (see Subsection 2.1.4 for details of disposal). From 6 to 11 August 1990, all abandoned piping to remain in place was capped and grouted per specifications.

2.1.3 Decontamination, Removal, and Disposal of Existing CWST and Vault Piping

On 3 May 1990, MARS was subcontracted to clean the CWST and cut and remove the associated vault piping. The piping was triple rinsed, as required in the specifications, with water and wrapped with plastic prior to disposal in the roll-off box. The rinse water was collected in the CWST. A SET Environmental, Inc. vacuum truck was used to remove the liquid and sludge to a depth of approximately two inches. Approximately 2,000 gallons of material was transported for disposal at Cyanokem, Detroit, Michigan (Appendix B). Following waste removal, MARS technicians pressure washed the interior of the tank. The decontamination rinse water was then pumped into the frac tank.

On 10 May 1990, the transfer pump in the vault was dismantled and flushed with water prior to being wrapped in plastic and disposed in the roll-off box.

The CWST was removed from the concrete vault on 20 June 1990. R.W. Collins Company dismantled the tank with a hydraulic shear on 22 June 1990. The sheared sections were disposed in the roll-off box.

On 12 July 1990, the roll-off box containing the decontaminated piping, transfer pump, and the CWST was transported by Fox Valley Disposal for disposal at Settler's Hill Landfill, Batavia, Illinois. Bill of lading and pick-up ticket are enclosed as Appendix C.

2.1.4 Decontamination Rinse Water Sampling and Analysis

As required in the specifications (rinse water sampling plan), decontamination rinse water samples were collected from the final decontamination rinse from the areas listed below:

- Existing CWSTS (Decon No. 1).
- Existing CWSTS from Section 5/6 (Decon No. 2).
- Existing CWSTS from Section 2 (Decon No. 3).
- Tap water used for decontamination rinse (Tap Water).
- Disposal analysis of frac tank contents (Frac Rank).

Samples were collected in accordance with the sampling plan provided in Appendix D. All samples were analyzed for a complete target list (CTL) analysis. A CTL analysis consists of a volatile organic analysis (VOA), base/neutral/acid extractables (BNA), total metals, cyanides, and phenols, and nonconventional and conventional pollutants. Analytical results are summarized in Table 2-2. The laboratory report for all rinsate and soil samples is included, under a separate cover, accompanying this report.

On 29 August 1990, the original signed copy of analytical data for the frac tank was submitted to AT&T. After a review of the analytical data, Section II(k)(3) of the draft Part B permit, 35 IAC 721.03, and Section 8-2B-11 of the Naperville Sewer Use Ordinance, AT&T determined that the decontamination water could be discharged into the sanitary sewer. MARS was subcontracted to discharge the water slowly from the frac tank into the sanitary sewer. Approximately 4,000 gallons of water was discharged into the sanitary sewer during a six-hour period. A copy of the discharge permit from AT&T is enclosed as Appendix E.

TABLE 2-2

RINSE SAMPLING ANALYTICAL RESULTS(a)
AT&T BELL LABORATORIES
NAPERVILLE, ILLINOIS

RINSE SAMPLE	TAP WATER	DECON#1	DECON#2	DECON#3	FRAC TANK WATER
I. Total Metals in ppm					
COD	BDL	28	29	10	570
Phenol	0.018	0.028	0.0070	BDL	0.038
Chromium	BDL	BDL	BDL	BDL	0.023
Copper	0.25	10.7	0.24	2.1	0.55
Mercury	BDL	1.3	BDL	BDL	BDL
Lead	0.038	0.11	0.072	0.57	0.096
Zinc	0.025	0.0025	0.085	0.028	0.014
II. Organics in ppb					
a. Volatiles					
Methylene Chloride	8 (B)		BDL	BDL	BDL
Acetone	24 (J)		BDL	BDL	BDL
b. Semi-volatiles					
Bis(2-ethylhexyl) phthalate	16(B)		14(B)	17(B)	26(B)
Di-n-Butylphthalate	BDL		16	5(J)	30
Acenaphthene	BDL		BDL	BDL	2(J)
Fluorene	BDL		BDL	BDL	4(J)
Phenanthrene	BDL		BDL	BDL	12
Di-n-Butylphthalate	BDL		BDL	BDL	30

Tap water is water used in the decontamination of underground pipe.
Decon #1 - Decontamination rinse water from existing CWST.
Decon #2 - Decontamination rinse water from existing CWSTS piping from Section 5/6.
Decon #3 - Decontamination rinse water from existing CWSTS piping from Section 2.
BDL - Below detection limit.
J - Estimated value for either a TIC or an analyte that meets the identification criteria but the result is less than the specified detection limit.
B - Compound was found in the laboratory blank and in the sample.
(a) Only compounds above method detection limits are tabulated.

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2.1.5 Soil Sampling

A soil sampling plan was prepared by AT&T (Appendix F) to provide analytical information to determine whether the underground CWSTS piping used to convey concentrated waste to the existing CWSTS had leaked. Initially, the sampling plan proposed 17 soil samples and 1 background soil sample along the CWSTS underground piping. One sample out of every four samples collected were specified for a CTL analysis. The remaining three samples were to be analyzed for a shortened target list (STL) analysis. A STL analysis consists of a total metals, cyanide, and phenols analysis. However, after reviewing the elevated VOA results of the S6 soil sample from the PC Shop, AT&T increased the number of samples collected for a CTL analysis from one out of four to two out of four samples. A VOA was also included for every sample collected for a STL analysis. An additional background soil sample was also collected for a CTL analysis.

Sample locations were selected near cleanouts, floor drains, and riser connections where at least two joints were present. The pipes in Section 5/6 were traced by M&M Radio Laboratories to locate cleanouts so that soil samples could be collected at those locations. Soil samples collected within the building were obtained by coring through the concrete to the underground pipe. Table 2-3 lists the sample number, location, date collected, sampling depth, and analysis performed on each sample. Figures 2-1, 2-2, 2-3, and 2-4 indicate soil sampling locations.

2.1.6 Soil Sampling Analytical Results

Soil sample analytical data for metals and organic compounds were evaluated by comparison to data from on-site background samples (S12, S19). In addition, soil sample analytical data for metals were compared to published data on typical concentrations found in U.S. soil (Appendix G). Soil sample analytical results are summarized in Table 2-4. All samples were analyzed by WESTON/Gulf Coast Laboratories, University Park, Illinois, as required in the soil sampling plan.

Metal Data

Data presented in Table 2-4 indicates that most metal concentrations are within or below the background concentration range. In cases where metal concentrations exceed the background concentration range, the exceedance was relatively small and in no case, with the exception of sample location S6, do the metal concentrations exceed the typical concentration range found in U.S. soil. Comparison of data from sample location S6 to data from the other sample locations indicates elevated concentrations of copper and lead. The copper concentration at sample location S6 exceeds the typical concentration range found in U.S. soil.

TABLE 2-3

SOIL SAMPLING PLAN SUMMARY TABLE
AT&T BELL LABORATORIES
NAPERVILLE, ILLINOIS

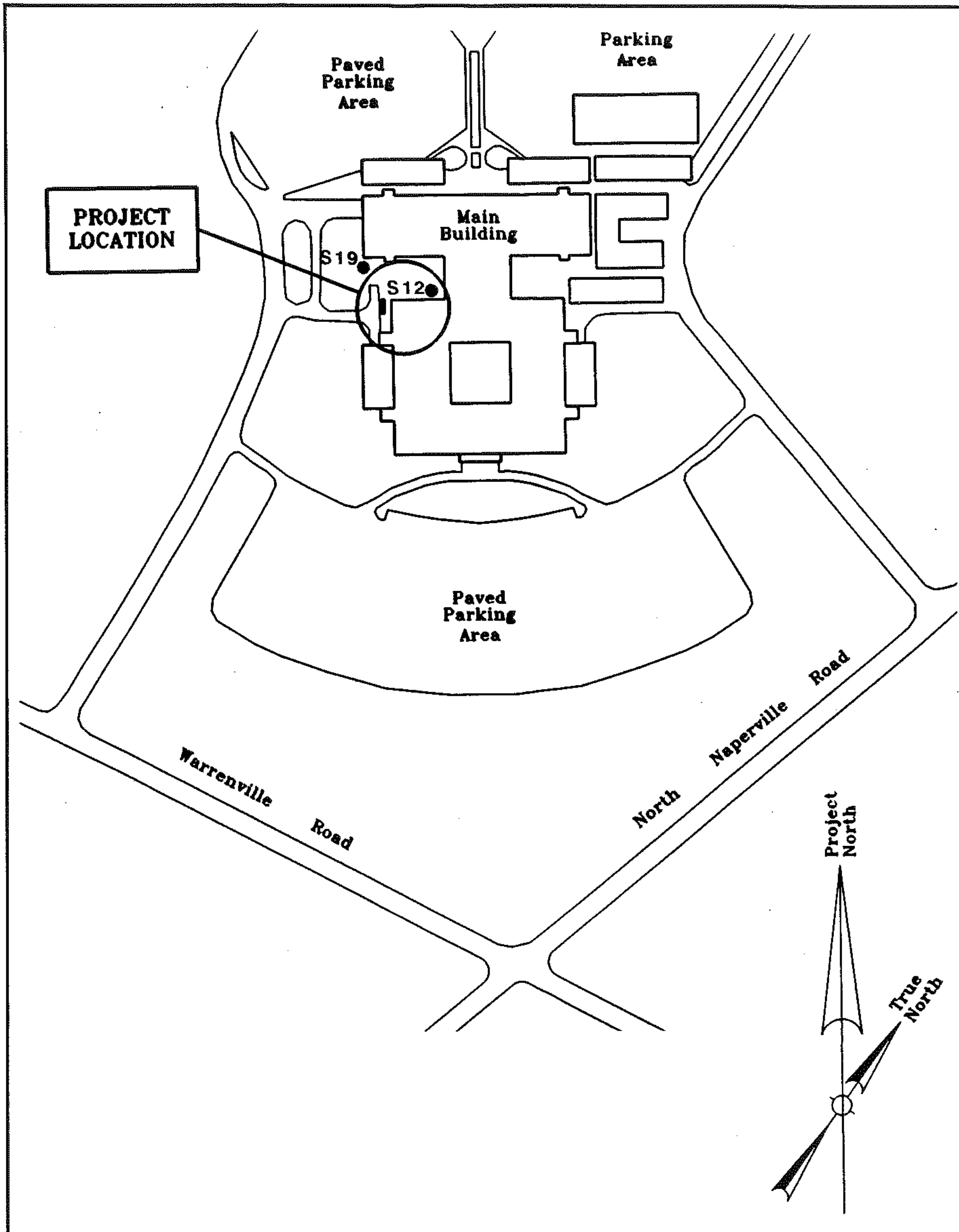
	Sample No.	Date Collected	Sample Depth	Analytical Parameters Specified Analysis	Additional Analysis
	S1	26 June 90	56"	CTL	
	S2	18 June 90	58"	STL	VOA
Section No. 2	S3	4 April 90	33-39"	CTL	
	S4	4 April 90	24-30"	STL	
	S5	18 June 190	55"	STL	VOA
	S6	27 April 90	12-18"	STL	VOA
	S7	24 July 90	114"	STL	VOA
	S8	24 July 90	96-120"	STL	VOA
	S9	24 July 90	90-114"	CTL	
Outside of Building	S10	24 July 90	84-120"	STL	VOA
	S11	31 July 90	72-96"	STL	VOA
	S12	27 April 90	78-102"	CTL	
	S19	27 April 90	78-102"	CTL	
	S13	18 June 90	82"	CTL	
	S14	26 June 90	78"	STL	VOA
Section No. 5/6	S15	18 June 90	59"	STL	VOA
	S16	15 June 90	77"	STL	VOA
	S17	15 June 90	76"	CTL	
	S18	15 June 90	59"	STL	VOA

CTL = Complete target list.
STL = Shortened target list.
VOA = Volatile organic analysis.

Note: All samples were collected below the CWSTS underground pipe, except for background samples S12 and S19.

Organic Compound Data

Data presented in Table 2-4 indicates that most organic compound concentrations are within or below the background concentration range. In cases where organic compound concentrations exceed the background concentration range, the exceedance was relatively small, the compound was also detected in the laboratory blank or was a relatively small estimated concentration with the exception of sample location S6. Comparison of data from sample location S6 to data from the other sample locations indicates elevated concentrations of acetone, tetrachloroethene, and xylene.



WESTON MANAGERS DESIGNERS/CONSULTANTS	Three Hawthorn Parkway Vernon Hills, Illinois 60061	FIGURE 2-4	BACKROUND SOIL SAMPLING LOCATIONS AT & T BELL LABS Naperville, Illinois

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TABLE 2-4

SOIL SAMPLING ANALYTICAL RESULTS*
AT&T BELL LABORATORIES
NAPERVILLE, ILLINOIS

SOIL SAMPLE	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
I. Total metals in ppm										
Arsenic	2.8	3.4	BDL	3.9	2.6	2.4	4.9	3.7	6.5	7.9
Beryllium	BDL	BDL	0.75	0.85	BDL	BDL	BDL	BDL	0.39	0.43
Cadmium	0.77	BDL	BDL	BDL	BDL	1.6	1.2	0.51	BDL	0.75
Chromium	4.3	3.5	2.5	4.6	3.1	40.3	4.7	5.6	11.6	14.6
Copper	7.6	6.2	3.5	8.3	9.5	1,290	20	11.6	17.6	19.3
Lead	BDL	10.5	BDL	BDL	6.3	369	7.8	BDL	6.9	9.6
Mercury	BDL	BDL	BDL	BDL	BDL	.74	BDL	0.099	BDL	0.13
Nickel	2.8	BDL	BDL	5.3	3.7	3.7	9.7	7.4	13.4	23
Selenium	BDL	BDL	BDL	BDL	BDL	15.6	BDL	BDL	BDL	BDL
Silver	BDL	BDL	BDL	BDL	BDL	5.4	BDL	BDL	BDL	BDL
Zinc	16.3	14.3	11.5	19.4	23.2	19.1	33.1	27	44.5	60
II. Organics in ppb										
<u>Volatiles</u>										
Acetone	54(B)	24(B)	47	NA	19(B)	99,000	36(B)	9(JB)	15(B)	26(B)
Methylene chloride	2(J)	4(J)	8(B)	NA	4(J)	BDL	270(B)	190(B)	26(B)	24(B)
Tetrachloroethene	BDL	BDL	BDL	NA	BDL	1,700(J)	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	4(J)	NA	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	NA	BDL	BDL	13.0	10.0	BDL	52
Trichloroethene	BDL	BDL	5(J)	NA	BDL	BDL	4(J)	BDL	BDL	BDL
Trichlorofluoromethane	BDL	BDL	BDL	NA	BDL	BDL	BDL	BDL	BDL	BDL
Xylene (Total)	BDL	BDL	BDL	NA	BDL	4,800	BDL	BDL	BDL	BDL
<u>Semivolatiles</u>										
Bis(2-ethylhexyl) phthalate	190(JB)	NA	200(JB)	NA	NA	NA	NA	NA	BDL	NA
Di-n-butylphthalate	BDL	NA	BDL	NA	NA	NA	NA	NA	35(J)	NA
Fluoranthene	BDL	NA	BDL	NA	NA	NA	NA	NA	BDL	NA
Phenanthrene	BDL	NA	BDL	NA	NA	NA	NA	NA	BDL	NA
Pyrene	BDL	NA	BDL	NA	NA	NA	NA	NA	BDL	NA

TABLE 2-4 (Cont.)

SOIL SAMPLING ANALYTICAL RESULTS*
AT&T BELL LABORATORIES
NAPERVILLE, ILLINOIS

SOIL SAMPLE	S11	S12 (Background)	S13	S14	S15	S16	S17	S18	S19 (Background)	Typical Conc. in Soils** (ppm)
I. Total metals (ppm)										
Arsenic	8.8	6.1	10.7	3.4	8.8	BDL	4.5	8.6	3.3	0.1-194
Beryllium	0.81	0.56	1.1	BDL	BDL	0.99	BDL	0.74	0.50	0.01-40
Cadmium	BDL	BDL	BDL	0.57	BDL	BDL	BDL	BDL	BDL	0.01-7
Chromium	22.4	12	28.3	6.1	13.3	18.8	5.5	12.9	9.7	5-3,000
Copper	34.3	21.6	34.1	8.8	27.9	23.3	9.7	24.4	18.7	2-250
Lead	17.8	9.8	24.7	BDL	11.2	14.8	5.2	13.6	10.8	<1.0-888
Mercury	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<0.01-4.6
Nickel	29	20.7	43.5	3.7	20.4	17.9	3.9	25.8	16.6	0.1-1,523
Selenium	BDL	BDL	BDL	BDL	BDL	1.3	2	1.6	BDL	0.01-38
Silver	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<0.01-8
Zinc	84.5	59.8	79.0	19.9	58.9	58.6	42.8	48.2	61.5	1-2,000
II. Organics in ppb										
<u>Volatiles</u>										
Acetone	54(B)	24(B)	120(B)	10(JB)	15(B)	72(B)	17(B)	50(B)	46(B)	--
Methylene chloride	12(B)	5(J)	13	4(J)	12	50((B)	49(B)	69(B)	13	--
Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4(J)	4(J)	--
Toluene	BDL	BDL	2(J)	BDL	BDL	1(J)	3(B)	4(J)	BDL	--
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	27	--
Trichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	11	--
Trichlorofluoromethane	BDL	BDL	3(J)	BDL	3(J)	BDL	BDL	BDL	BDL	--
Xylene (Total)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	--
<u>Semivolatiles</u>										
Bis(2-ethylhexyl)-phthalate	NA	130(JB)	71(JB)	NA	NA	NA	80(JB)	NA	160(JB)	--
Di-n-butylphthalate	NA	BDL	BDL	NA	NA	NA	BDL	NA	BDL	--
Fluoranthene	NA	BDL	BDL	NA	NA	NA	70(J)	NA	BDL	--
Phenanthrene	NA	BDL	BDL	NA	NA	NA	42(J)	NA	BDL	--
Pyrene	NA	BDL	BDL	NA	NA	NA	67(J)	NA	BDL	--

S12 - Background soil sample.
S19 - Background soil sample.

B - Indicates the compound was found in the laboratory blank and the sample.
BDL - Below detection limits.
J - Indicates an estimated value for an analyte that meets the identification criteria but the result is less than the specified detection limit.
NA - Not analyzed.
ND - Not detected.
--- - Not available.
* Only compounds above method detection limits are tabulated.
** See Appendix G for references.

SECTION 3

PC SHOP CLEANUP

The closure plan for the CWSTS required collection of a sample from beneath the elbow of the floor drain in the PC Shop. This sample was collected during removal of the floor drain. As discussed in Subsection 2.1.5, the soil sample (S6) indicated elevated levels of copper, lead, acetone, tetrachloroethene, and total xylene when compared to the background concentration range and to the other 16 investigative samples collected at the other locations during closure activities. The following section discusses the activities which were conducted to remediate the contaminated soil around the PC Shop floor drain.

3.1 FLOOR REMOVAL

The floor in the PC Shop consisted of two layers of concrete with an intervening layer of sand (Photo 8). On 10 May 1990, Litgen Coring, Inc. was subcontracted to cut a 6 foot by 8 foot area of the first layer of concrete around the floor drain (Photo 10). MARS, Inc. removed the concrete rubble and staged it in 55-gallon steel drums. Visual observation of the sand layer beneath the first layer of concrete revealed grayish-black stains in the immediate area around the floor drain pipe (Photo 11 and 13). MARS, Inc. excavated the sand layer and staged it into 55-gallon steel drums (Photo 12). Removal of the sand revealed that the second layer of concrete was stained a bluish-green color (Photo 17).

On 14 May 1990, MARS, Inc. removed a 4 foot by 4 foot area of the second layer of concrete (Photo 19). The concrete rubble was staged in 55-gallon steel drums.

3.2 SOIL REMOVAL

On 15 May 1990, MARS, Inc. began excavating the soil around the floor drain. Excavation was done using a pick, pry-bar and shovel due to the confined work space and the very dense clay. As excavation progressed, discolored soil was observed around the floor drain pipe (Photo 15).

On 16 May 1990, MARS, Inc. completed excavation of the soil around the floor drain (Photo 16). A small pocket of liquid was observed near the west wall of the excavation approximately 2.5 feet below the second layer of concrete. Photo-ionization detector (PID) measurements beneath the elbow of the floor drain were 50 to 70 units above background. MARS, Inc. removed the vertical section floor drain pipe and attached elbow and capped the pipe that was abandoned in place (Photo 18).

The certifying licensed Illinois Professional Engineer examined the vertical section of floor drain pipe and attached elbow to determine if the soil contamination was the result of pipe failure. The pipe material did not appear to have deteriorated during its service life, and the joint between the vertical section of pipe and the elbow was tight. The vertical section of floor drain pipe and attached elbow were tested by filling the vertical section with tap water and looking for leaks in the pipe and through the joint. No leaks were observed.

Based on conversations with Mr. Frank Girdwain of AT&T, it is believed that the soil contamination occurred when diluted (with water) waste liquid was discharged into a funnel placed in the floor drain at a rate which exceed the capacity of the floor drain. This caused the diluted waste to temporarily pool on top of the drain, allowing some of the waste liquid to flow through small cracks in the bonding material (concrete) between the concrete flooring and the drain. The volume of waste liquid flowing through the small cracks in the bond between the floor drain and the first layer of concrete was probably very small during each occurrence, but over the service life of the system, could have resulted in the stains that were observed. This theory appears logical based on the localized stain soil around the drain pipe below the first layer of concrete and the surficial stains observed on the second layer of concrete.

Headspace measurements for volatile organic compounds (VOCs) were used as the screening method to determine the extent of contamination. The procedure for performing headspace readings for VOCs was as follows:

- Collect soil sample with stainless steel spatula and seal the sample jar with aluminum foil.
- Allow approximately 15 minutes for sample to reach equilibrium.
- Shake jar for approximately 30 seconds and allow an additional two minutes for equilibrium.
- Perform headspace readings by penetrating the aluminum foil with the PID probe.

The target headspace reading for the screening procedure was assumed to be five units above background.

On 16 May 1990, headspace measurements were taken from the soil surfaces of the north, west, and south walls and bottom of the excavation (Photo 18). The headspace measurements (Table 3-1) were north wall-30 units, west wall-150 units, south wall-30 units, and bottom-120 units. Based on the initial headspace measurements, 1 foot of soil was excavated from each of the three walls and the

TABLE 3-1

HEADSPACE READINGS FROM PC SHOP REMOVAL*
AT&T BELL LABORATORIES
NAPERVILLE, ILLINJOIS

Location	Initial Surface	Incremental One-Foot Excavation			
	16 May 1990	16 May 1990	17 May 1990	18 May 1990	18 May 1990
North Wall	30	5	2.5	5	<1
West Wall	150	90	2.0	100,100,100	<1
South Wall	30	1	---	4-5	<1
Bottom	120	50	---	20-40	---

* Headspace readings are reported in units above background level in ambient air.
--- Headspace sample not collected.

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bottom. The excavated soil was put into 55-gallon steel drums. Headspace measurements were again taken from each of the three walls and bottom. The headspace measurements (Table 3-1) were north wall-5 units, west wall-90 units, south wall-1 unit, and bottom-50 units.

On 17 May 1990, additional concrete from the second layer of concrete was removed to allow expansion of the excavation. Based on headspace measurements discussed above, an additional 1 foot of soil was removed from the north and west walls and the excavation was also expanded in the southwest direction to remove visibly-contamination soil.

Headspace measurements were taken from the north wall and west wall. The headspace measurements (Table 3-1) were north wall-2.5 units and west wall-2.0 units. Headspace measurements were not taken from the bottom; however, PID measurements taken in the middle of the trench bottom showed zero units above background.

On 18 May 1990, PID readings of the excavation walls revealed no readings above background. However, discolored soil observed in the bottom of the excavation indicated PID readings between 20 to 40 units above background. Two headspace measurements were performed on samples collected near the discolored soil. Headspace measurements were between 40 to 50 units above background. The bottom was excavated an additional one foot, and two headspace samples were collected. Headspace measurements were between 20 to 40 units above background. Headspace samples were then collected from each wall. The number of samples and headspace measurements are as follows:

- North wall (one sample) - 5 units.
- West wall (three samples) - 100 units, 100 units, 100 units.
- South wall (one sample) - 4 to 5 units.

Based on these headspace measurements, the north, west, and south walls were excavated an additional one foot. Headspace samples were subsequently collected from the three walls which indicated measurements less than one unit each.

At this point in the extent-of-contamination investigation, all visibly-contaminated soil had been removed and headspace measurements indicated that the horizontal contamination had been defined and removed. Headspace measurements from the bottom of the excavation were still above the assumed screening level of five units. In order to extend the excavation vertically to meet the screening level of five units, it would have been necessary to significantly expand the horizontal area of the excavation. The physical constraints surrounding the PC shop, such as the foundation and the walls, made expansion of the excavation impossible. Any further expansion of the excavation could pose a threat to the structural integrity of the building (Photos 21-24). Therefore, AT&T and Roy F. Weston, Inc. (WESTON) decided to end the extent-of-contamination investigation and collect confirmation soil samples.

3.3 CONFIRMATION SOIL SAMPLE AND ANALYSIS

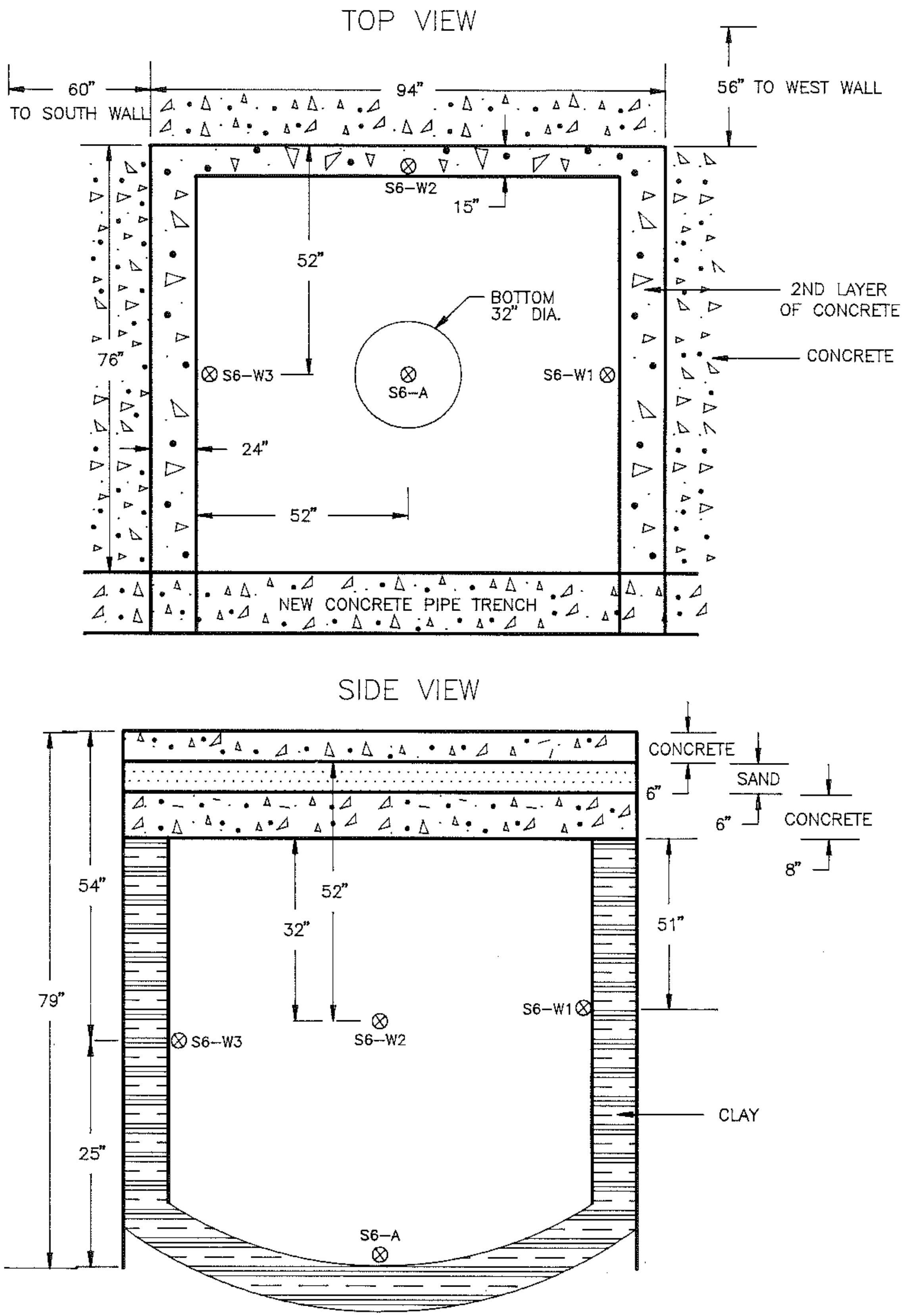
On 18 May 1990, confirmation soil samples were collected from the north (S6-W1), west (S6-W2), and south (S6-W3) excavation walls and excavation bottom (S6-A) (Figure 3-1). The sample locations for the three excavation walls were located 51 to 54 inches from grade. The bottom soil sample was collected at the deepest depth of the trench at approximately 79 inches. A composite sample (S6-W composite) was also collected from three locations along the excavation bottom. Samples S6-A, S6-W1, S6-W2, and S6-W3 were analyzed for VOAs, and the composite sample was analyzed for total metals, cyanide, and phenols, and conventional and nonconventional pollutants by Gulf Coast Laboratories, University Park, Illinois (Table 3-2).

The analytical results shown in Table 3-2 indicate that the metal contaminants of concern (copper and lead) in the composite wall sample are above background levels but are within the concentration range found in U.S. soil and are significantly less than pre-cleanup concentrations. Analytical data for metal contaminants of concern (copper and lead) in the excavation bottom sample are also above background levels but are significantly less than pre-cleanup concentrations.

Analytical results for VOC contaminants of concern (acetone and tetrachloroethene) are above background levels but are significantly less than pre-cleanup levels, with the exception of acetone in sample S6-W2. The reason for this high value is unknown since a headspace measurement of a sample from the west wall taken prior to confirmation sampling was less than one unit (Table 3-1). Headspace measurements at 1-foot increments indicated a significant reduction in contamination. All visibly contaminated soil has been removed. The excavation has been backfilled and a new concrete floor overlying the area. Therefore, surface water cannot infiltrate the contaminated area. Thus, reducing or eliminating downward mobility to the groundwater.

3.4 SOIL DISPOSAL

On 28 June 1990, soil samples were collected from the 26 55-gallon steel drums containing the contaminated soil from the PC shop. The samples were analyzed for Illinois Greensheet Parameters. The contaminated soil was being permitted as a special waste. Upon review of the analytical results and the source of the contamination, the PC shop waste was reclassified from special



WESTON MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

FIGURE 3-1

PC SHOP
SOIL SAMPLING LOCATIONS
AT&T BELL LABS
Naperville, Illinois

REV. C

27490

TABLE 3-2

ANALYTICAL RESULTS FROM PC SHOP*
AT&T BELL LABORATORIES
NAPERVILLE, ILLINOIS

	Background		Pre-Cleanup	Post-Cleanup				S6-W Composite	Typical Conc. in Soils (ppm)
	S12	S19	S6	S6-A	S6-W1	S6-W2	S6-W3		
I. Total metals in ppm									
Arsenic	6.1	3.3	2.4	9.2	NA	NA	NA	6.8	0.1-194
Cadmium	BDL	BDL	1.6	BDL	NA	NA	NA	BDL	.01-7
Chromium	12.0	9.7	40.3	47.6	NA	NA	NA	24.8	5-3,000
Copper	21.6	18.7	1,290	271	NA	NA	NA	96.5	2-250
Lead	9.8	10.8	369	13.4	NA	NA	NA	9.5	<1.0-888
Mercury	BDL	BDL	0.74	0.25	NA	NA	NA	0.28	<0.01-4.6
Nickel	20.7	16.6	3.7	25.6	NA	NA	NA	20.9	0.1-1,523
Selenium	BDL	BDL	15.6	1.8	NA	NA	NA	BDL	0.01-38
Silver	BDL	BDL	5.4	BDL	NA	NA	NA	BDL	<0.01-8
Zinc	59.8	61.5	19.1	63.0	NA	NA	NA	54.6	1-2,000
II. Volatiles in ppb									
Acetone	24.0(B)	46(B)	99,000	33,000	1,600	240,000	9,200	NA	---
Ethylbenzene	BDL	BDL	BDL	BDL	1.0(J)	BDL	BDL	NA	---
Methylene Chloride	5.0(J)	13.0	BDL	2.0(J)	5.0(J)	5.0(J)	5.0(J)	NA	---
Tetrachloroethene	BDL	4(J)	1,700(J)	2.0(J)	4.0(J)	5(J)	BDL	NA	---
Toluene	BDL	BDL	BDL	BDL	5.0(J)	BDL	4.0(J)	NA	---
1,1,1-Trichloroethane	BDL	27	BDL	BDL	3.0(J)	3.0(J)	3.0(J)	NA	---
Trichloroethene	BDL	11.0	BDL	BDL	3.0(J)	1.0(J)	BDL	NA	---
Xylene (Total)	BDL	BDL	4,800	16	3.0(J)	69	7	NA	---

Notes:

S-6	Collected near elbow of floor drain before cleanup.
S6-A	Collected at the bottom of the trench.
S6-W	Composite collected from the three walls of the trench.
S6-W1	Collected from the north wall of the trench.
S6-W2	Collected from the west wall of the trench.
S6-W3	Collected from the south wall of the trench.
BDL	Below detection limits.
NA	Not analyzed.
B	Indicates the compound was found in the blank and the sample.
J	Indicates an estimated value for an analyte that meets the identification criteria. The result is less than the specified detection unit.
--	Not applicable.
*	Only compounds above method detection limits are tabulated.

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waste to a hazardous waste. The PC shop waste did not meet the definition of a special waste because the source of the contamination was spent waste from the PC shop. On 4 October 1990, additional soil samples were collected and analyzed for toxicity characteristic leaching procedure (TCLP) metals, TCLP VOCs, polychlorinated biphenyls (PCBs), F-listed solvents, total organic carbon, water reactivity, percent moisture, and sulfite. However, the method detection limits for acetone and methanol were above treatment standards tabulated in 40 CFR Part 268.41. Therefore, additional soil samples were collected on 8 March 1991. Samples were analyzed for TCLP methanol and acetone with a method detection limits below the stipulated treatment standard. Chemical Waste Management of Indiana, Inc., in Fort Wayne, Indiana requested that an additional sample be analyzed for TCLP nitrobenzene. The additional sample was collected on 16 September 1991. Analytical results of the disposal soil sampling are provided in Appendix H. All soil samples were analyzed by WESTON/Gulf Coast Laboratories, University Park, Illinois.

On 26 December 1991, MARS mobilized a small Bobcat front-end loader and transferred the contents of the 26 55-gallon steel drums into a 20-cubic yard roll-off box. The PC Shope waste was transported to Chemical Waste Management of Indiana, Inc., Fort Wayne, Indiana. A copy of the manifest and waste profile sheet is provided in Appendix I.

SECTION 4

CERTIFICATION OF CONSTRUCTION

Closure Certification of the CWSTS system is based on inspections on an as necessary basis and by a licensed Illinois Professional Engineer and/or his designated representative and review of pertinent data. The certifying licensed Illinois Professional Engineer for the project was James Michael Burton, P.E. (062-043086) and his designated representatives were Willy Pua and Steven R. Bosko. The attached certification statement provides formal acknowledgement that it is the opinion of the certifying licensed Illinois Professional Engineer that the CWSTS was closed in accordance with the Part B Permit (LPC #0438050004, Part B Permit Log No. 107).

ATTACHMENT C-1

This statement is to be completed by both the responsible officer and by the registered professional engineer upon completion of closure. Submit one copy of the certification with original signatures and three additional copies

The hazardous waste management unit at the facility described in this document has been closed in accordance with the specifications* in the approved closure plan. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

USEPA ID Number

Facility Name

Signature of Owner/Operator

Name and Title

Signature of Registered P.E.

Name of Registered P.E. and Illinois Registration Number

Date

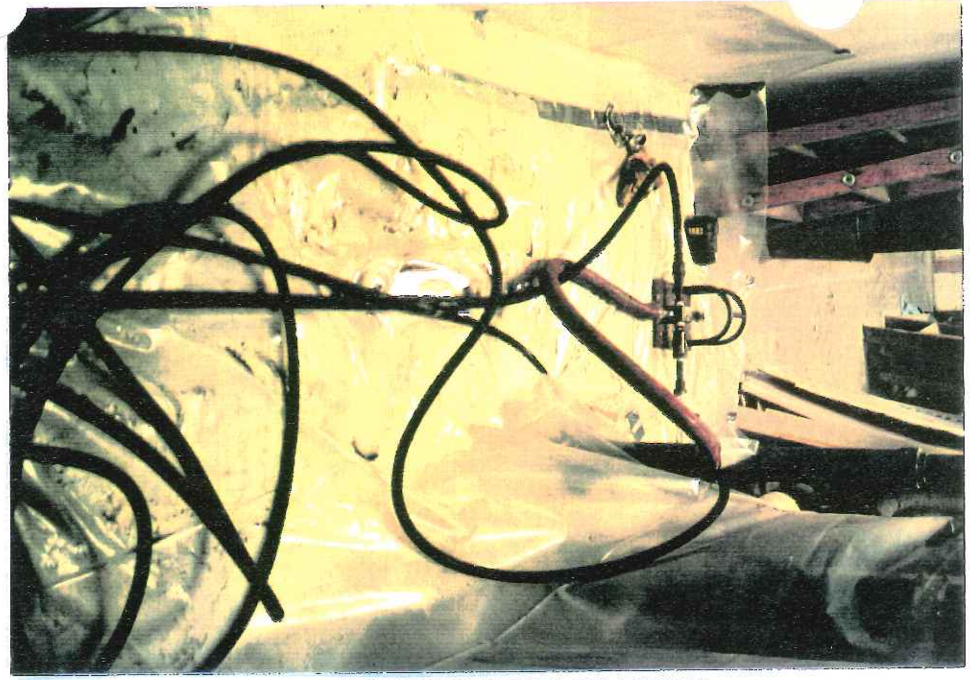
*Specifications for Concentrated Waste System Renovation prepared for AT&T Bell Laboratories by Camp Dresser and McKee, January 1990.

Concentrated Waste Storage Tank System Environmental Engineering Management Services Specification prepared by AT&T Bell Laboratories, Project No. 190380F January 1990

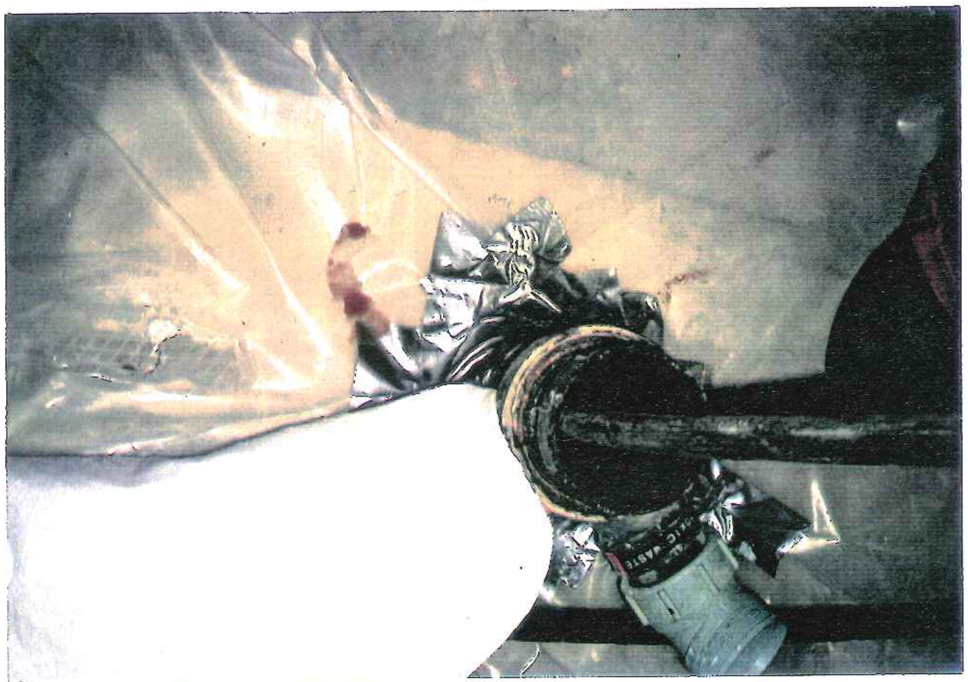
APPENDIX A

PHOTOGRAPHS OF CLOSURE ACTIVITIES

1) DECONTAMINATION OF PIPING IN THE SERVICE CORE OF BUILDING 6



2) DECONTAMINATION OF PIPING AT LOCATION S17 IN BUILDING 6



3) CLOSE-UP OF PRESSURE HOSE DURING DECONTAMINATION AT A FOUR INCH RISER AT LOCATION S15

4) SAMPLING PORT & LINE MOLE ACCESS

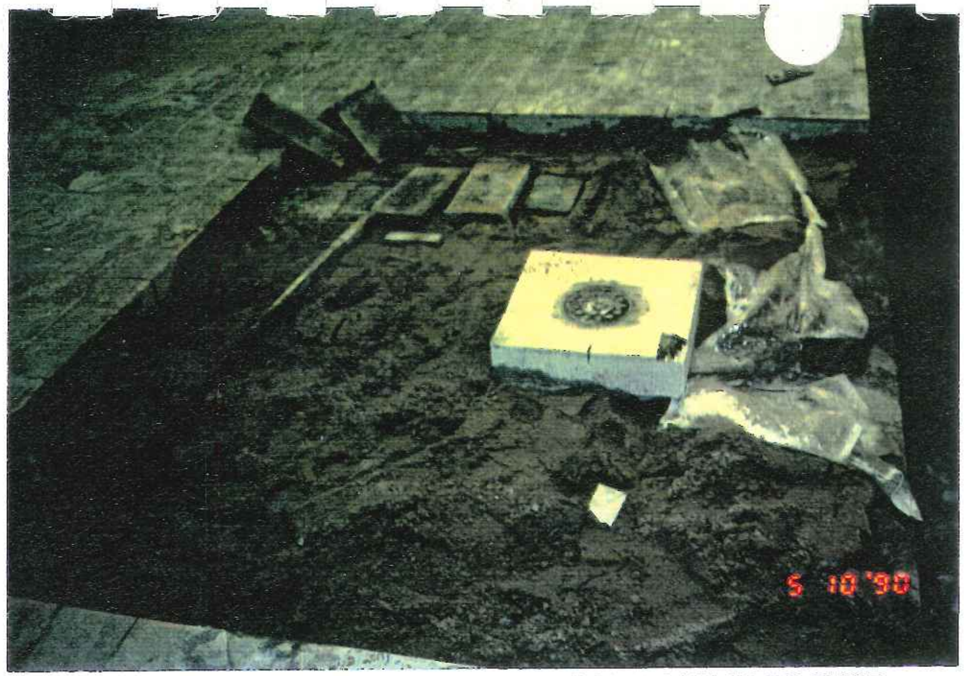
5) DECONTAMINATION AT THE LAST SECTION OF PIPING BEFORE VAULT ENTRY

6) FRAC TANK

7) CREW PUMPING DECONTAMINATION WATER FROM THE TANK INTO THE FRAC TANK

8) EXCAVATION IN PC SHOP TO COLLECT SAMPLE S6 BELOW THE ELBOW JOINT

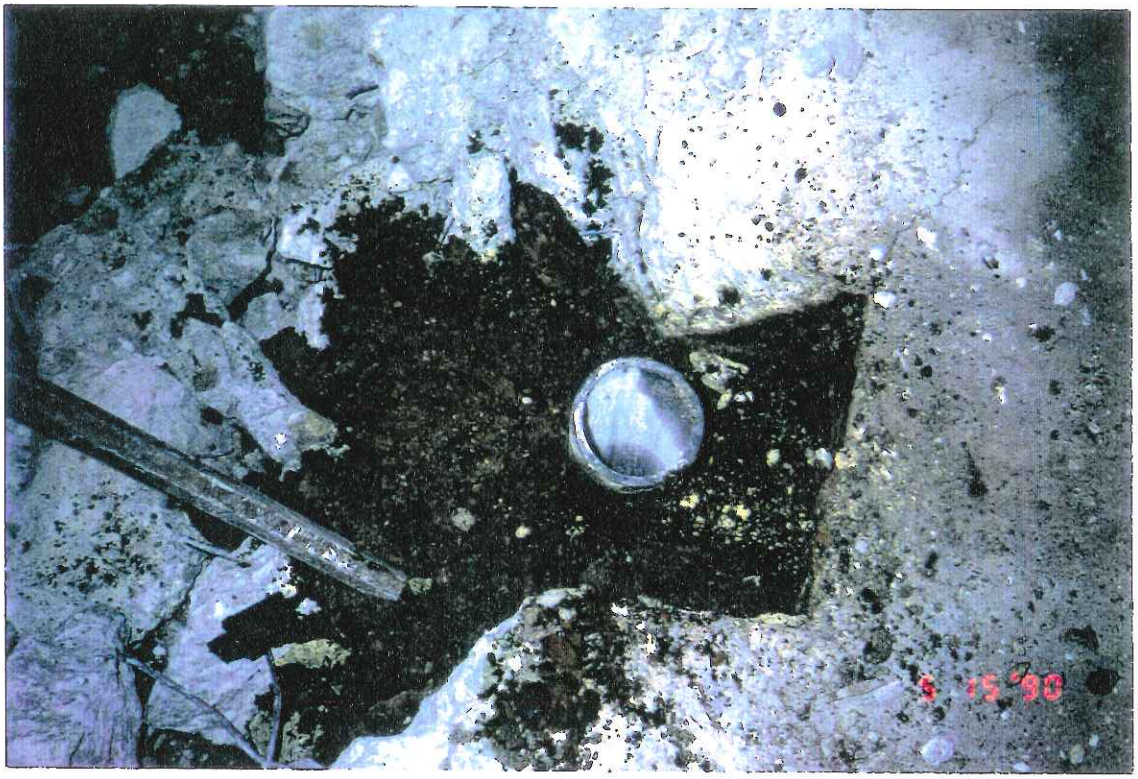
9) PIPING AT S6 LOCATION



10) CONCRETE REMOVAL AROUND FLOOR DRAIN IN PC SHOP

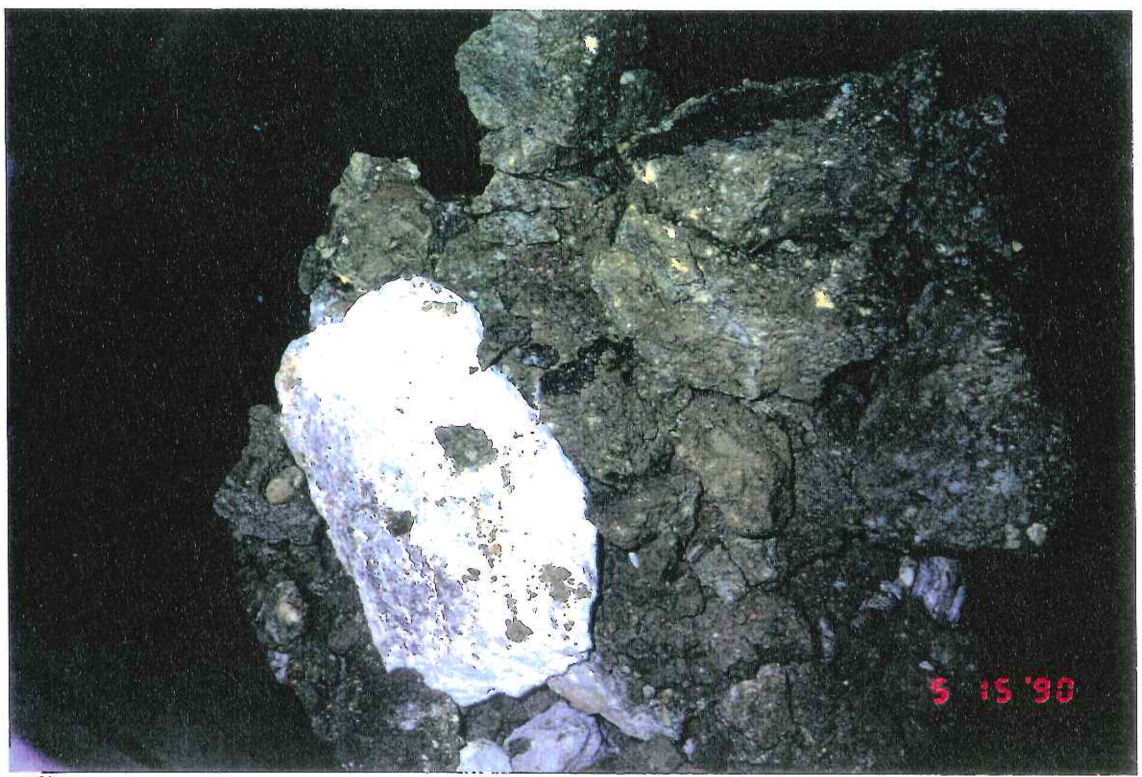
11) STAINED SANDS AROUND FLOOR DRAIN IN PC SHOP

12) SECOND LAYER OF CONCRETE AFTER SAND REMOVAL IN PC SHOP



13)

SOIL DISCOLORATION AROUND FLOOR DRAIN IN THE PC SHOP



14)

CONTAMINATED SOIL & CONCRETE FROM THE EXCAVATION PIT

15)

SOIL DISCOLORATION AROUND FLOOR DRAIN PIPING IN THE PC SHOP

16)

EXPOSED FLOOR DRAIN PIPING & SOIL DISCOLORATION IN THE PC SHOP

17) GREENISH STAIN ON SECOND LAYER OF CONCRETE IN PC SHOP

18) PID HEADSPACE SAMPLE LOCATIONS BEFORE SOIL EXCAVATION IN THE PC SHOP

19) EXCAVATION PIT FACING THE WEST WALL AFTER ONE FOOT EXCAVATION IN THE PC SHOP

20) SOIL REMOVAL AT THE NORTHWEST CORNER OF THE EXCAVATION PIT IN THE PC SHOP

21) SOIL REMOVAL WEST & SOUTHWEST IN THE EXCAVATION PIT

22) SOIL REMOVAL FACING SOUTHWEST IN THE EXCAVATION PIT

23) CLOSE-UP OF SOIL REMOVAL IN ~~SOUTHEAST~~ CORNER
WEST

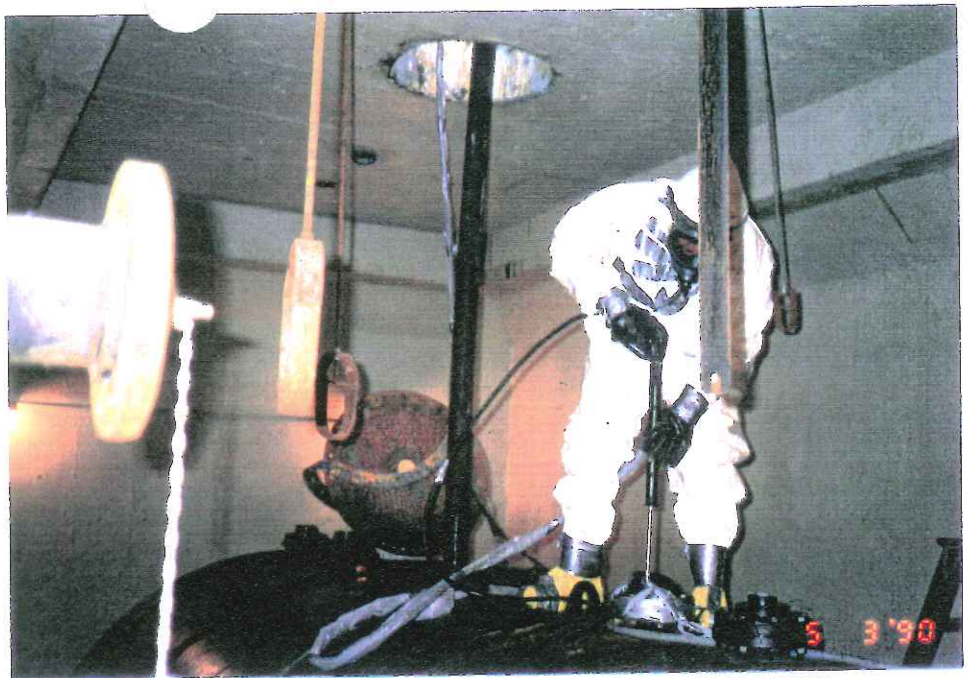
24) SOIL REMOVAL AT THE BOTTOM OF THE EXCAVATION PIT

25) NORTH WALL OF EXCAVATION PIT AFTER SOIL REMOVAL

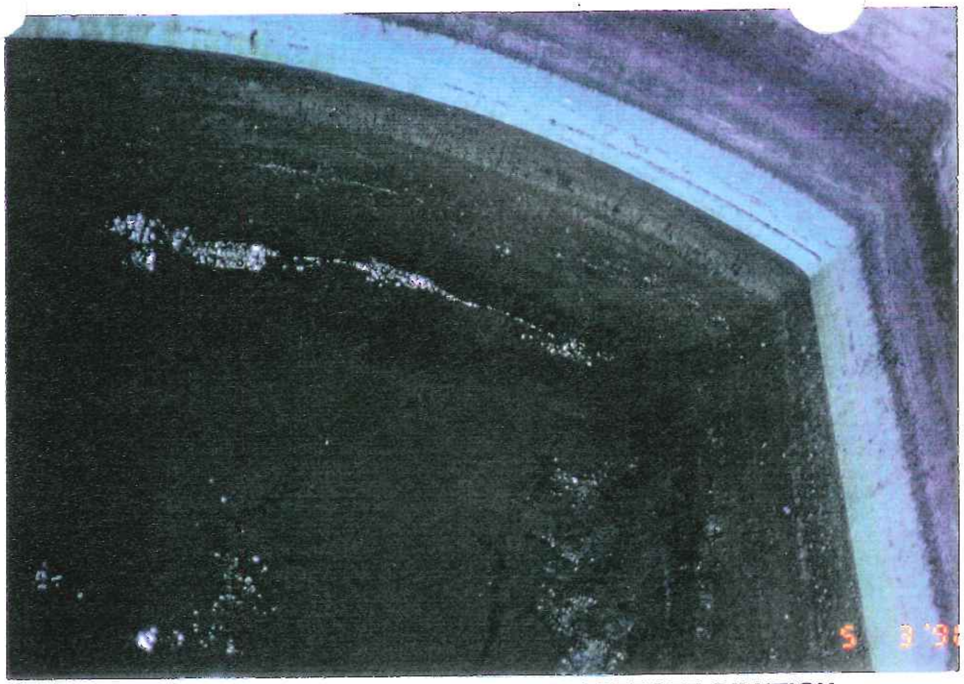
26) CONTAMINATED SOIL REMOVED FROM THE SOUTHWEST WALL OF THE EXCAVATION PIT

27) STAGED DRUMS FROM THE PC SHOP CLEAN-UP

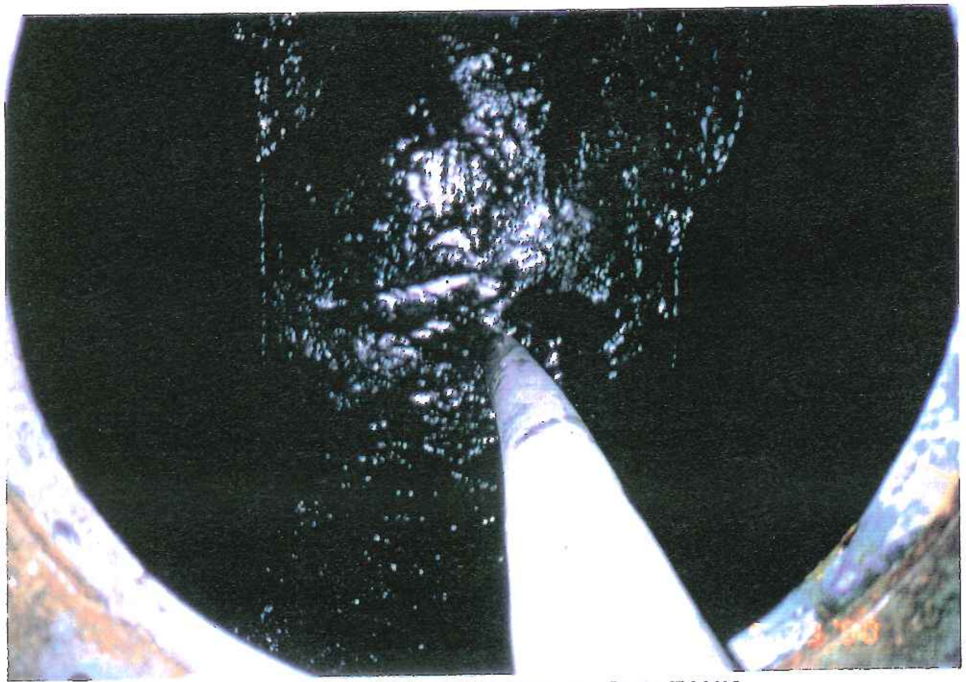
28) TRIPOD USED DURING DECONTAMINATION OF OLD TANK



29) CREW MEMBER DILUTING SLUDGE IN OLD TANK

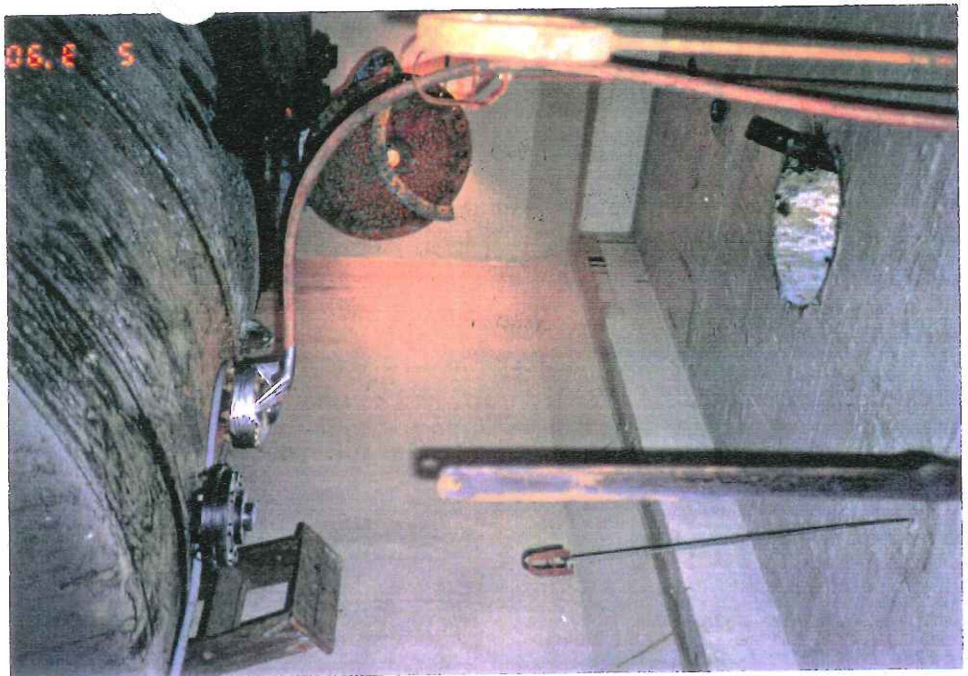


30) SLUDGE INSIDE THE OLD TANK BEFORE DILUTION

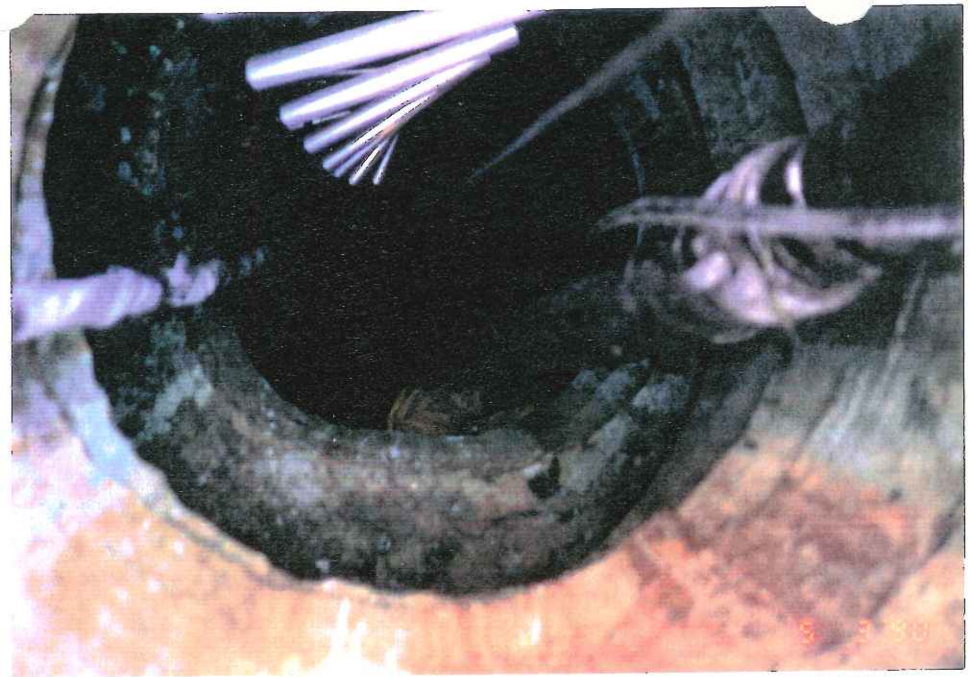


31) CLOSE-UP OF SLUDGE IN OLD TANK

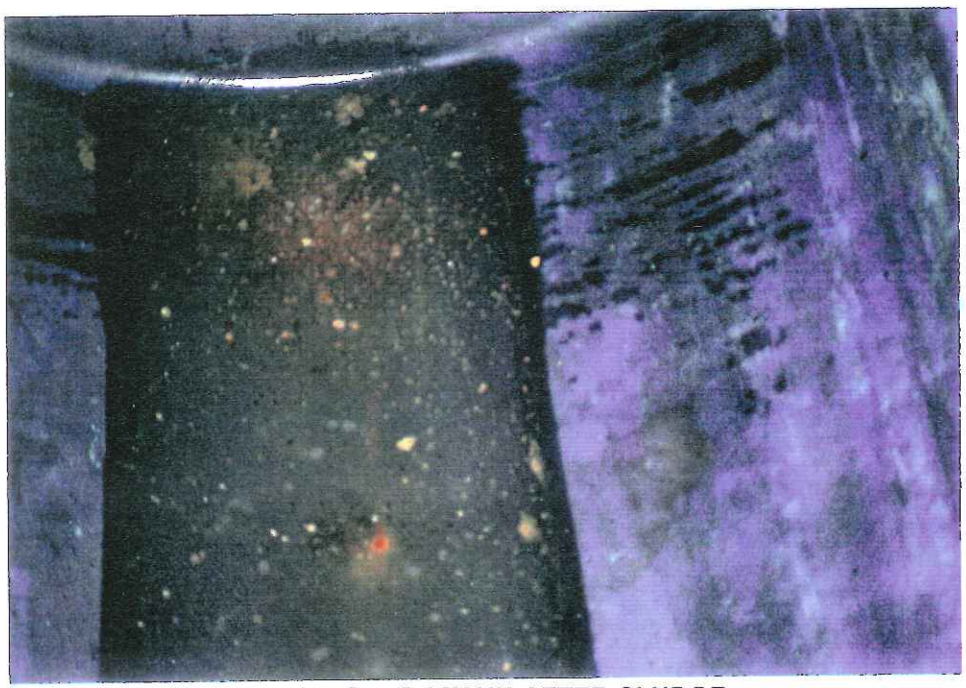
32) VACUUM HOSE REMOVING SLUDGE FROM OLD TANK



33) PURGING TANK WITH COMPRESSED AIR



34) CREW MEMBER REMOVING SLUDGE WITH VACUUM HOSE



35) BOTTOM OF TANK AFTER SLUDGE REMOVAL & DECONTAMINATION

36) CONCRETE SLAB REMOVAL FROM THE VAULT

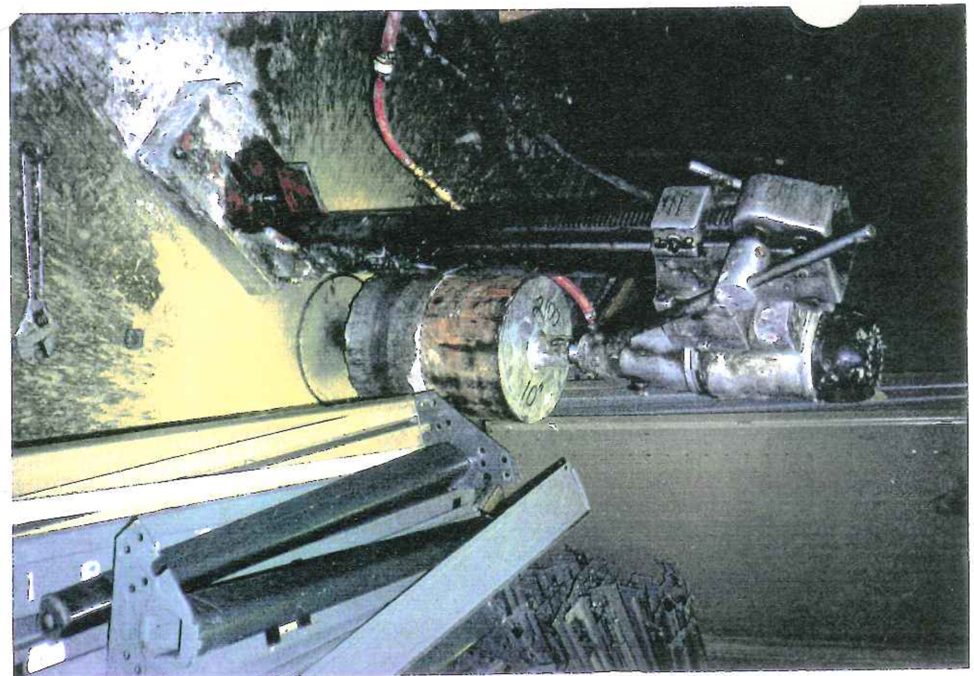
37) ALL TANK OPENINGS WERE COVERED PRIOR TO TANK REMOVAL

38) TANK DECOMMISSIONED WITH TANK SHEARS

39) ROLL-OFF BOX CONTAINING DECONTAMINATED PIPING, PUMP & TANK SCRAPS

40) CREW COLLECTION OUTDOOR SOIL SAMPLES WITH DRILL RIG

41) SOIL SAMPLE IN SPLIT SPOON AT LOCATION S12



42) CEMENT CORING TO COLLECT INDOOR SOIL SAMPLES

43) SOIL SAMPLES AT LOCATION S1

44) GROUTING AT LOCATION S1 AFTER SAMPLING

45) PC SHOP SOIL TRANSFERRED INTO A ROLLOFF BOX FOR DISPOSAL

46) LOADED, COVERED & MANIFESTED LOAD OF PC SHOP WASTE TRANSPORTED FOR DISPOSAL

APPENDIX B

CYANOKEM MANIFEST

Required under authority of Act 64 PA 1979, as amended and Act 136 PA 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, PA 1969

DNR
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

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Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: ILD068698314
Manifest Document No.: 69580
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: AT&T BELL Laboratories, 2000 N. Napeville Rd. Napeville IL 60566
4. Generator's Phone (708) 979-=271

A. State Manifest Document Number: MI 1869580
B. State Generator's ID: SAME

5. Transporter 1 Company Name: SET Environmental
6. US EPA ID Number: ILD098642424? [illegible]
C. State Transporter's ID: 597
D. Transporter's Phone: 708-537-2221

7. Transporter 2 Company Name:
8. US EPA ID Number:
E. State Transporter's ID:
F. Transporter's Phone:

9. Designated Facility Name and Site Address: CyanoKem, 12381 Schaefer Highway, Detroit Mi 48227
10. US EPA ID Number: MID980991566? [illegible]
G. State Facility's ID: N/A
H. Facility's Phone: 313-933-1650

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/H
a. RQ Waste Corrosive Liquid NOS. Corrosive Material. (D002) UN1760	X	001	TT	02000	G	D002	H
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above
L/T,C - < 11.5% Solids, < 0.5% metals
< 2.0% organics 7 86% water

K. Handling Codes for Wastes Listed Above
a/ 1
b/ 1
c/ 1
d/ 1

15. Special Handling Instructions and Additional Information
CyanoKem Code - C18064 / W13558 Illinois State Transporter # 0049

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: W. Q. Thornton
Signature: W Q Thornton
Date (Month Day Year): 05 11 ??

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: CHRIS DECKERT
Signature: Chris Deckert
Date (Month Day Year): 05 11 90

18. Transporter 2 Acknowledgement or Receipt of Materials
Printed/Typed Name:
Signature:
Date (Month Day Year):

19. Discrepancy Indication Space

17213

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: ALPHONSO WALTERS "FOR CHEM"
Signature: Alphonso Walters "For Chem"
Date (Month Day Year): 05 14 90

GENERATOR / TRANSPORTER / FACILITY

IN CASE OF EMERGENCY OR SPILL, CONTACT THE NATIONAL RESPONSE CENTER 1-800-424-8802 / MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM 1-800-292-4706 — SPILLS MUST BE REPORTED TO MICHIGAN WITHIN 24 HOURS PER DAY

EPA Form 8700-22 (Rev. 9/88)

To be mailed by TSD Facility to: Michigan DNR, Box 30038, Lansing, MI 48909

PR 5110 Rev. 9/88

CyanoKEM Inc.
12381 Schaefer Highway
Detroit, MI 48227
(313) 933-1850

CERTIFICATE OF DISPOSAL

Route To: AT&T BELL LABORATORIES
2000 N NAPERVILLE RD
NAPERVILLE, IL 60566

ATTN:

This letter represents certification that the waste shipment referenced below was received and has been treated and disposed of by CyanoKEM, Inc. according to all applicable rules and regulations.

DATE OF LAST PRODUCTION: 05/14/90

MANIFEST NUMBER: 1869580

GENERATOR: AT&T BELL LABORATORIES

DATE OF RECEIPT: 05/14/90

Authorized Signature

APPENDIX C

SETTLER'S HILL BILL OF LADING AND PICK-UP TICKET

Original-Not Negotiable Straight Bill of Lading

Fox Valley Disposal (Name of Carrier) Carrier's No.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading,

at July 12 1990 19 From AT&T BELL LABS, NAPERVILLE, IL.

...perty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official, Southern, Western and Illinois Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to SETTLER'S HILL LANDFILL

(Mail or street address of consignee—For purposes of notification only)

Destination Batavia State IL. Zip County Delivery Address ★

★ To be filled in only when shipper desires and governing tariffs provide for delivery thereat.

Route

Delivering Carrier Car or Vehicle Initials No.

No. Packages	Kind of Package, Description of Articles, Special Marks, and Exceptions	*WEIGHT (Subject to Correction)	Class or Rate	Check Column
One	~~Roll off box contains cut-out storage~~			
	~~tank, associated piping and miscellaneous~~			
	~~debris. (under Miscellanous Special Waste~~			
	~~Profile Sheet SHL-WMA 034159).~~			
	(Truck # 409)			
	(Box # 20-242)			

Subject to Section 7 of Conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid, write or stamp here; "To be Prepaid."

Received $ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per (The signature here acknowledges only the amount prepaid.)

Charges Advanced:

$

†Shipper's imprint in lieu of stamp; not a part of Bill of Lading approved by the Interstate Commerce Commission.

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.

NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

per

†The fibre boxes used for this shipment conform to the specifications set forth in the box maker's certificate thereon, and all other requirements of the Consolidated Freight Classification.

J. Wayne McCoy 7/12/90 Shipper, Per Fox Vally Disposal Agent, Per

Permanent post-office address of shipper,

Fox Valley Disposal, Fort-O-
30 North Kirk Road
Batavia, Illinois 60510
708/879-4390
A Waste Management Company

SERVICE TICKET AGREEMENT/NON-HAZARDOUS WASTES

ORDER NUMBER	SERVICE DATE
016183	7-12-90
TIME IN	**TIME OUT**

ROUTE ID	DISPOSAL ID	DISPOSAL TICKET
409		

SIGNATURE	COD AMOUNT

DIVISION NUMBER ACCOUNT NUMBER SERVICE TYPE HRO

CUSTOMER Roy Weston Bell Labs

ADDRESS Naper + Warrenville Rds

CITY

ACTION	ORD QTY	SERVICE DESCRIPTION	WASTE TYPE	BILL CODE	MEASURE	BILL QUANTITY	AMOUNT
RR	1	30 yd. Box					

COMMENTS

SERVICES ACCEPTED SUBJECT TO THE TERMS AND CONDITIONS ON THE REVERSE SIDE AND PAYMENT AGREED TO BE MADE IN ACCORDANCE WITH THE CONTRACTOR'S CURRENT RATE SCHEDULE.

CUSTOMER SIGNATURE Willy Pia - WESTON

CONTRACTOR SIGNATURE W7117

CTMS-0038TBK (2/88) WHITE - OFFICE YELLOW - CUSTOMER PINK - CONTROL

Printed on recycled paper.

[redacted]

APPENDIX D

AT&T RINSE WATER SAMPLING PLAN

Attachment 2

Rinse Water Sampling Plan for the Assessment of the Decontamination Process from the Concentrated Waste Storage Tank System Renovation Project at Indian Hill Facility, Naperville, Illinois

1.0 Purpose

The rinse water sampling plan provides sampling procedures and test methods to be used to characterize rinse waters, in accordance with RCRA regulations, resulting from the decontamination procedure on the Concentrated Waste Storage Tank (CWST) and underground piping. Federal and State regulations require that these rinse waters be characterized with respect to their physical and chemical properties so they may be managed in a manner which will minimize any possible threat to human health and the environment. In addition, these analyses will be used as a measure of the effectiveness of the decontamination procedures.

2.0 Implementation

A detailed chemical and physical analysis of the CWST system rinse waters will be conducted (under 35 I.A.C. Part 724.113), to determine whether hazardous constituents remain, inside the CWST and underground piping to be abandoned, as defined by the State and Federal regulations. For the Indian Hill facility, the concentrated wastes contained within the CWST have been tested and found to be non-hazardous special waste. However, this waste is managed as if it is a corrosive, (Type D002), waste. The corrosive classification is being used because variations in research and development activities may result in a corrosive waste being generated. Analysis of the concentrated waste stream is presented in Table A.

3.0 Frequency of Analysis

Samples will be taken of the final rinse waters from the CWST, abandoned CWSTS piping in building 2, abandoned piping in buildings 5 and 6, and a composite rinse water sample from the removed piping, pump, and other miscellaneous items. A sample of the CWST's final rinse water will be taken. A sample of the underground piping final rinse waters will be taken prior to entering the CWST. A sample of the water used for the final rinses will be collected and analyzed for the same parameters as the rinse waters.

TABLE 2-2

CHEMICAL CHARACTERIZATION OF STORAGE TANK CONTENTS

	Analysis of 8/15/88 Sample	Analysis of 10/24/88 Sample
Nitrogen, Ammonia (mg/L)	---	2,590
pH	7.97	8.22
Solids, Dissolved (TDS) (mg/L)	32,600*	15,100
Solids, Suspended (TSS) (mg/L)	29,300	256
Total Organic Carbon (TOC) (mg/L)	---	7,090
Chemical Oxygen Demand (COD) (mg/L)	38,800	18,906**
Copper (mg/L)	11,000	1,750
Iron (mg/L)	20	0.9
Lead (mg/L)	0.19	<0.1
Nickel (mg/L)	1.1	<0.1
Zinc (mg/L)	40.4	7.80
Chromium, total (mg/L)	<1	<0.1

--- - not analyzed, not estimated
* - estimated from total solids analysis
** - maximum, estimated from TOC analysis

(170)

4.0 Parameters and Rationale

All rinse water samples, will be tested for those compounds listed in Table B. Testing for these compounds will allow comparison with previous waste profile results. In addition, the choice of testing parameters is based on the characteristics of chemicals used in the printed circuit and thin films coating laboratories.

5.0 Quality Assurance

5.1 Sampling Methods

Concentrated Waste Storage Tank

The sample from the concentrated waste storage tank will be collected according to the methods specified in 40 CFR 261, Appendix I. These regulations are described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods". For aqueous sampling from a storage tank, this document recommends using a weighted bottle to sample the contents. Two types of sampling procedures are used at the AT&T Bell Laboratories Indian Hill Facility: (1) A laboratory-cleaned sample bottle is attached to the sounding pole used during the tank inspection. The sample bottle is lowered to the tank bottom, the liquid is allowed to flow by gravity into the bottle and, upon removal, the bottle is sealed, properly labeled., and (2) A length of flexible tubing is placed in the tank contents, and the liquid sample is collected by using a pump to retrieve the liquids. The tube is placed at a predetermined depth and a sample is collected.

Underground Piping

The sample shall be collected just before or as the final rinse water leaves the piping. The rinse water shall not be sampled from a drum, tank, or any other potentially contaminated unit, if at all possible. The piping may have to be reconfigured to accommodate sampling.

All sampling equipment should be constructed of stainless steel or borosilicate glass. All equipment shall be decontaminated according to the following procedure:

1. Non-phosphate detergent plus tap water wash.
2. Tap water rinse.
3. Distilled/deionized water rinse.
4. 10% Nitric acid rinse (trace metal or higher grade Nitric Acid diluted with distilled/ deionized water).
5. Distilled/deionized water rinse.
6. Methanol (pesticide grade) rinse.
7. Total air dry or pure nitrogen blow out.
8. Distilled/deionized water rinse.

Table B
List of Analytical Parameters

Parameter		Units
Volatile Organics		
1	Acetone	UG/L
2	Acrolein	UG/L
3	Acrylonitrile	UG/L
4	Benzene	UG/L
5	Bis(chloromethly)ether	UG/L
6	Bromoform	UG/L
7	Carbon Tetrachloride	UG/L
8	Chlorobenzene	UG/L
9	Chlorodibromomethane	UG/L
10	Chloroethane	UG/L
11	2-Chloroethylvinyl Ether	UG/L
12	Chloroform	UG/L
13	Dichlorobromomethane	UG/L
14	Dichlorodifluoromethane	UG/L
15	1,1-Dichloroethane	UG/L
16	1,2-Dichloroethane	UG/L
17	1,1-Dichloroethylene	UG/L
18	1,2-Dichloropropane	UG/L
19	1,3-Dichloropropylene	UG/L
20	Ethylbenzene	UG/L
21	Methyl Bromide	UG/L
22	Methyl Chloride	UG/L
23	Methylene Chloride	UG/L
24	1,1,2,2-Tetrachloroethane	UG/L
25	Tetrachloroethylene	UG/L
26	Toluene	UG/L
27	1,2-trans-Dichloroethylene	UG/L
28	1,1,1-Trichloroethane	UG/L
29	1,1,2-Trichloroethane	UG/L
30	Trichloroethylene	UG/L
31	Trichlorofluoromethane	UG/L
32	Vinyl Chloride	UG/L
	Plus largest 15 purgeable volatile organic peaks	
Acid Extractable Compounds		
33	2-Chlorophenol	UG/L
34	2,4-Dichlorophenol	UG/L
35	2,4-Dimethylphenol	UG/L
36	4,6-Dinitro-o-cresol	UG/L
37	2,4-Dinitrophenol	UG/L
38	2-Nitrophenol	UG/L
39	4-Nitrophenol	UG/L
40	p-Chloro-m-cresol	UG/L
41	Pentachlorophenol	UG/L
42	Phenol	UG/L
43	2,4,6-Trichlorophenol	UG/L
	Plus largest 10 acid extractable peaks	

Table B
List of Analytical Parameters
(Continued)

Parameter		Units
Base/Neutral Extractable Compounds		
43	Acenaphthene	UG/L
44	Acenaphthylene	UG/L
45	Anthracene	UG/L
46	Benzidine	UG/L
47	Benzanthracene	UG/L
48	Benzopyrene	UG/L
49	3,4-Benzofluoranthene	UG/L
50	Benzoperylene	UG/L
51	Benzofluoranthene	UG/L
52	Bis(2-chloroethoxy)methane	UG/L
53	Bis(2-chloroethyl)Ether	UG/L
54	Bis(2-chloroisopropyl)Ether	UG/L
55	Bis(2-ethylhexyl)Phthalate	UG/L
56	4-Bromophenyl Phenyl Ether	UG/L
57	Butylbenzyl Phthalate	UG/L
58	2-Chloronaphthalene	UG/L
59	4-Chlorophenyl Phenyl Ether	UG/L
60	Chrysene	UG/L
61	Dibenzanthracene	UG/L
62	1,2-Dichlorobenzene	UG/L
63	1,3-Dichlorobenzene	UG/L
64	1,4-Dichlorobenzene	UG/L
65	3,3'-Dichlorobenzidine	UG/L
66	Diethyl Phthalate	UG/L
67	Dimethyl Phthalate	UG/L
68	Di-n-butyl Phthalate	UG/L
69	2,4-Dinitrotoluene	UG/L
70	2,6-Dinitrotoluene	UG/L
71	Di-n-octyl Phthalate	UG/L
72	1,2-Diphenylhydrazine (as azobenzene)	UG/L
73	Fluoranthene	UG/L
74	Fluorene	UG/L
75	Hexachlorobenzene	UG/L
76	Hexachlorobutadiene	UG/L
77	Hexachlorocyclopentadiene	UG/L
78	Hexachloroethane	UG/L
79	Indenopyrene	UG/L
80	Isophorone	UG/L
81	Napthalene	UG/L
82	Nitrobenzene	UG/L
83	N-Nitrosodimethylamine	UG/L
84	N-Nitrosodi-n-propylamine	UG/L
85	N-Nitrosodiphenylamine	UG/L
86	Phenanthrene	UG/L
87	Pyrene	UG/L
88	1,2,4-Trichlorobenzene	UG/L
	Plus largest 15 base/neutral extractable peaks	

Table B
List of Analytical Parameters
(Continued)

Parameter	Units
Other Toxic Pollutants: Metals, Cyanide, and Phenols	
89 Antimony, Total	UG/L
90 Arsenic, Total	UG/L
91 Beryllium, Total	UG/L
92 Cadmium, Total	UG/L
93 Chromium, Total	UG/L
94 Copper, Total	UG/L
95 Lead, Total	UG/L
96 Mercury, Total	UG/L
97 Nickel, Total	UG/L
98 Selenium, Total	UG/L
99 Silver, Total	UG/L
100 Thallium, Total	UG/L
101 Zinc, Total	UG/L
102 Cyanide, Total	UG/L
103 Phenol, Total	UG/L
Conventional and Nonconventional Pollutants	
104 Chemical Oxygen Demand	MG/L
105 Conductivity	UMHOS/SQ CM
106 Corrosivity	N/A
107 Cyanide, Reactive	UG/L
108 Isopropyl Alcohol	UG/L
109 Nitrogen, Ammonia	MG/L
110 pH	S.U.
111 Sulfide, Total	UG/L
112 Sulfide, Reactive	UG/L
113 Total Organic Carbon (TOC)	MG/L
114 Total Organic Halides (TOX)	MG/L
115 Total Suspended Solids (TSS)	MG/L
116 Total Dissolved Solids (TDS)	MG/L

All cleaned sampling equipment will be numbered in a manner that will not affect their integrity and wrapped in a material (e.g. aluminum foil) that has either been autoclaved or cleaned in the same manner as the sampler. Equipment should be custody sealed and information concerning the decontamination methodology, date, time, and personnel should be recorded in the field log book.

During sampling, all activities will be recorded in a log book to provide an accurate record of the sampling event and the procedures followed. Entries made by sampling personnel in the log book include:

- Project Name/Purpose
- Date
- Field Observations (Weather, etc.)
- Description of Sampling (Diagram if Necessary)
- Sample Label Information (Analytical Parameters, Preservation, etc.)
- Field Measurements
- Signature
- Intended Handling of Sample; Chain of Custody Form Number

Sampling logs of each sampling point are to be prepared and include as a minimum:

- Date/Time/Weather
- Sampler/Geologist/Soil Scientist Names
- Sample Point Identification (including Location, Matrix, and Sample Depth)
- Sketch Showing the Sampling Point Location (including Reference Distances)
- Depth to Water and/or Bedrock (Refusal) When Encountered
- Soil Profile
- Sample Recovery (and Portion Submitted for Analysis)
- Sampling Equipment Used
- Field Measures (Where Appropriate)
- General Comments (e.g. Odor, Staining, etc.)

A field blank composite sample will be taken of every type of sampling equipment used at the site during the sampling event. A field blank is conducted using two identical sets of cleaned sample containers. One set of containers is empty and will serve as the sample containers to be analyzed. The second set of containers are filled with laboratory demonstrated analyte free water (documentation to be available upon request). At the field location this analyte free water is to be poured over the clean sample equipment and placed in the empty sample containers for analysis. Field blanks are to be handled, transported, and analyzed in the same manner as samples acquired that day. Field blanks must be performed at a rate of one per sampling day. Field blanks must be packaged with their associated matrix.

Trip blanks must be provided by contract laboratory. Trip blanks must accompany the only samples which will be analyzed for volatile organics at a rate of one per shipment. Trip blanks must be filled at the laboratory with laboratory demonstrated analyte free water. Documentation that this water is analyte free must be available upon request. Contractor shall try to minimize the number of sampling days for the samples which will be analysed for volatile organics.

The field crew will also label each sample container with the appropriate information necessary to identify the sample as listed below:

Unique Sample Identification Number
Date
Time of Sampling
Name
Preservation
Analyses
Samplers Initials

This information is then supplemented and cross-referenced on a Chain-of-Custody form which provides documentation of the handling of each sample from the time it is collected until it is relinquished to the laboratory.

A Chain-of-Custody form containing the information listed below is filled out by the field crew and signed by the sampler and all personnel handling the sample(s) before the sample(s) is relinquished to the laboratory. The Chain-of-Custody form should contain the following information:

Project Name
Date
Samplers Initials
Sample Identification Number
Time of Sample Collection
Name/Description of Sample (Analytical Parameters)
Preservation
Number of Containers
Holding Conditions and Locations
Signature of all Handlers and Date and Time of Transfers
Organization or Affiliation of all Handlers and Reason for Transfer

All samples will be preserved at the time of collection and packaged in coolers of sufficient size to hold all containers, ice, and packing material to prevent breakage. Cooler shall be of suitable type and integrity.

5.2 Sample Analyses

At the laboratory, receipt of samples is recorded on the Chain-of-Custody form by laboratory personnel. The original or a copy of the form is returned to the shipper. The Chain-of-Custody record is checked, by laboratory personnel, against the information on the sample container labels and other information regarding the analysis requested. If any discrepancies are discovered they are resolved with the person requesting the analysis and recorded to provide a permanent record of the event. A record of the information detailing the handling of a particular sample through each stage of analysis is provided by completing a laboratory chronicle form. This form typically provides the following information:

Job Reference
Sample Matrix
Sample Number
Date Sampled
Date and Time Received by Laboratory
Holding Conditions
Analytical Parameter
Extraction Date/Time and Extractor's Initials
Analysis Date/Time and Analyst's Initials
QA Batch Number, Date Reviewed and Reviewer's Initials

Analyses of samples shall be done in accordance with USEPA-Contract Lab Program Methodologies summarized in Table C.

The contract laboratory will provide sample containers for the requested analyses appropriate for each matrix to be analyzed for. The sample containers will be of sufficient size to permit replicate analyses to be run from the sample matrix. All unused portions of samples will be archived by the laboratory until written notification from AT&T Bell Laboratories regarding there disposition. The contract laboratory will also retain all samples and sample extracts in a sample archive for possible future replicate analyses.

Calibration and periodic inspection of laboratory instruments shall be in accordance with USEPA and/or manufacturer's specifications. Reference standards and QC samples (spikes, blanks, and duplicates) will be used as necessary to determine the accuracy and precision of procedures, instruments and operators. If QC sample analysis results indicate QC values outside the control limit range, sample analysis will be suspended until the instrument is recalibrated.

ble C

Analysis of Targeted Compound List/Targeted Analyte List

Using USEPA-Contract Lab Program Methodologies for Aqueous and Nonaqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Organics	Aqueous-G, black phenolic plastic screw cap, teflon-lined septum	Aqueous - 40 ml	Cool, 4 deg C, dark,	10 days	USEPA-CLP Statement of Work for Organics Analysis 10/86	(3)
	Nonaqueous-G, polypropylene cap, white teflon liner	Nonaqueous 120 ml		As Above		
Base Neutral/ Acid Extractable Organics	Amber G, Teflon lined cap	1000 ml	Cool, 4 deg C, dark	Extraction Aqueous - 5 days Non-aqueous 10 days	As Above	(3)
				Analysis - 40 days from VTSR*		
Pesticide/PCB's	As Above	As Above	As Above	As Above	As Above	(3)

*Verified time of sample receipt (at the laboratory).

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time	Analytical Methodology	Sample Container Cleaning
2,3,7,8-TCDD	As Above	As Above	As Above	Extraction Aqueous-7 days Nonaqueous-90 days Analysis- 40 days from extraction	USEPA-CLP Statement of Work for 2,3,7,8-Tetrachloro-p-dioxin Analysis 9/83	(3)
Metals except Hg	Aqueous - P bottle, P cap, P liner Nonaqueous - Flint Glass bottle, black phenolic cap, polyethylene liner	Aqueous - 1000 ml Nonaqueous 4,8,16, or 32 oz	Aqueous - HNO_3 to PH<2 Nonaqueous - 4 deg C until analysis	180 days As Above	USEPA-CLP Statement of Work for Inorganics Analysis 7/87	(3)
Hg	As Above	As Above	As Above	26 days	As Above	(3)
Cyanide	As Above	As Above	Aqueous - 0.6g ascorbic acid if residual Cl, NaOH to pH>12, cool, 4 deg C until analyzed $CaCo_3$ in presence of sulfide Nonaqueous Cool, 4 deg C until analyzed	14 days	As Above	(3)

Analysis of Organic Compounds Using USEPA 500 Series Methodologies for Potable Water Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Halogenated Organics - Potable Water	Glass screw cap vial with PTFE-faced silicone septum	40 ml - 120 ml	pH<2 with 1:1 HCl Storage at 4 deg C from time of collection until analysis	14 days	40 CFR 141, 142: Method 502.1	(4)
Volatile Organic Compounds - Potable Water	Glass screw cap vial with PTFE-faced silicone septum	40 ml - 120 ml	As Above	14 days	40 CFR 141, 142: Method 502.2	(4)
Volatile Aromatic and Unsaturated Organic compounds - Potable Water	Glass screw cap vial with PTFE-faced silicone septum	40 ml - 120 ml	As Above	14 days	40 CFR 141, 142: Method 503.1	(4)
Volatile Organic Compounds - Potable Water	Glass screw cap vial with PTFE-faced silicone septum	60 ml - 120 ml	As Above	14 days	40 CFR 141, 142: Method 524.1	(4)
Volatile Organic Compounds - Potable Water	Glass screw cap vial with PTFE-faced silicone septume	60 ml - 120 ml	As Above	14 days	40 CFR 141, 142: Method 524.2	(4)
1,2-Dibromo-ethane (EDB) and 1,2-Dibromo-3-chloropropane (DBCP) - Potable Water	Glass screw cap vial with PTFE-faced silicone septum	40 ml	As Above	28 days	40 CFR 141, 142: Method 504	(4)

*Holding time begins at time of sample collection.

Analysis of Organic and Inorganic Compounds Using USEPA SW-846 Methodologies
for Aqueous, Non-aqueous, and Waste Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Volatile Organics - Concentrated Waste Samples	G, wide mouth, teflon liner	8 oz	None	14 days	SW-846, 3rd edition, Vol 1-B; GC-8010, 8015, 8020; GC/MS-8240	(5)
Volatile Organics - Liquid Samples no residual Cl	G vial, teflon lined septum cap	40 ml	4 drops conc. HCl, cool, 4 deg C	As Above	As Above	(5)
Volatile Organics - Liquid Samples residual Cl	As Above	As Above	Collect sample in 4 oz Soil VOA container prepreserved w/10% $Na_2S_2O_3$. Gently mix sample and transfer to 40 ml VOA vial prepreserved w/4 drops conc. HCl, cool, 4 deg C	As Above	As Above	(5)
Volatile Organics - Liquid Samples for Acrolein and Acrylonitrile	As Above	As Above	Adjust to pH 4-5, cool, 4 deg C	As Above	SW-846, 3rd edition, Vol 1-B; GC-8030; GC/MS-8240	(5)

*Holding time begins at time of sample collection.

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time	Analytical Methodology	Sam. Container Cleaning
Volatile Organics - Soil/Sediments Sludge	G, wide mouth, teflon liner	4 oz	Cool 4 deg C	As Above	SW-846, 3rd edition, Vol 1-B; GC-8010, 8015, 8020; GC/MS-8240	(5)
Sulfates	P, G	1 liter (12)	Cool, 4 deg C	28 days	SW-846, 3rd edition, Vol 1-C; 9035, 9036, 9038	(6)
Total Organic Carbon	G-Preferred P-If determined that there is no contributing organic contamination	1 liter (12)	Cool, 4 deg C, dark, HCl or H_2SO_4 to pH<2 if analysis can't be done within 2 hrs	2 Hrs - unpreserved 28 days - preserved	SW-846, 3rd edition, Vol 1-C; 9060	(6)
Phenols	G only	1 liter (12)	Cool, 4 deg C, H_2SO_4 to pH<2	28 days	SW-846, 3rd edition, Vol 1-C; 9065, 9066, 9067	(6)
Total recoverable oil and grease	G only, wide mouth	1 liter	None	Unpreserved- Few hrs	SW-846, 3rd edition, Vol 1-C; 9070	(7)
			5 ml HCl, Cool 4 deg C	Preserved - 28 days		
Oil and grease for sludge	G	1 liter (12)	None	28 days	SW-846, 3rd edition, Vol 1-C; 9071	(7) No plastic tubing

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time	Analytical Methodology	Sample Container Cleaning
Total Coliform	P, G	1 liter (12)	Cool 4 deg C, $Na_2S_2O_3$ if residual Cl, EDTA if high in heavy metals	6 hrs	SW-846 3rd edition, Vol 1-C; 9131, 9132	(8)
Nitrate	P, G	1 liter (12)	Cool, 4 deg C,	24 hrs - Unpreserved	SW-846, 3rd edition, Vol 1-C; 9200	(6)
			H_2SO_4 to pH<2, (2 ml/L)	28 days - preserved		
Chloride	P, G	1 liter (12)	None	28 days	SW-846, 3rd edition, Vol 1-C; 9250, 9251, 9252	(6)
Radium 228	P	1 liter (12)	None	Transport to lab within 5 days, preserve at lab with HNO_3 to pH<2, hold for minimum of 16 hrs before analysis, 6 mos.	SW-846, 3rd edition, Vol 1-C; 9320	(6)
			HNO_3 to pH<2, suggested at sampling	6 mos		
Extractable Organics - Concentrated Waste Samples	G, wide mouth w/teflon liner	8 oz	None	14 days	SW-846, 3rd edition, Vol 1-B; GC-8080; GC/MS-8270	(5)

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time	Analytical Methodology	Sample Container Cleaning
Extractable Organics - Liquid Samples no residual Cl	G, amber, w/teflon liner	1 gallon or 2 1/2 gallon	Cool, 4 deg C	Extraction 7 days Analysis - 40 days from extraction	As Above	(5)
Extractable Organics- Liquid Samples residual Cl	G, amber, w/teflon liner	1 gallon or 2 1/2 gallon	3 ml 10% $Na_2S_2O_3$ per gallon, cool 4 deg C	Extraction 7 days Analysis - 40 days from extraction	As Above	(5)
Extractable Organics - Soils/Sediments Sludges	G, wide mouth, w/teflon liner	8 oz	Cool 4 deg C	14 days	As Above	(5)
Metals except Cr VI and Hg	P, G	600 ml	HNO_3 to pH<2	6 mos	SW-846, 3rd edition, Vol 1-A; 7000 series	(9)
Hg	P, G	400 ml	HNO_3 to pH<2	28 days	SW-846, 3rd edition, Vol 1-A; 7470, 7471	(9)
Cr VI	P, G	400 ml	Cool, 4 deg C	24 hrs	SW-846, 3rd edition, Vol 1-A; 7195, 7196, 7197, 7198	(9)

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time	Analytical Methodology	Sample Container Cleaning
Cyanide, total and amenable to chlorination	P, G	1 liter or larger	Cool, 4 deg, NaOH to pH>12, 0.6g ascorbic acid	14 days	SW-846, 3rd edition, Vol 1-C, 7195,7196, 7197,7198	(9)
Total Organic Halides (TOX)	G, vials, teflon septa. Amber G, teflon lined cap/foil lined cap	250 ml	Cool, 4 deg C, dark, H_2SO_4 to pH<2, no headspace	Not specified by the method	SW-846, 34d edition, Vol 1-C; 9020, 9022	(10)
Sulfides	P, G	1 liter (12)	Cool, 4 deg C, add 4 drops zinc acetate per 100 ml sample, NaOH to pH>12	7 days	SW-846, 3rd edition, Vol 1-C; 9030	(6)

Analysis of Organic Compounds Using USEPA 600 Series Methodologies for Aqueous Samples

Parameter	Sample Container (1)	Container Volume	Preservation (2)	Maximum Holding Time*	Analytical Methodology	Sample Container Cleaning
Halogenated Volatiles	G, teflon lined septum	25 ml or larger	Cool, 4 deg C, 0.008% $Na_2S_2O_3$ if residual Cl	14 days	40 CFR 136: GC-601 GC/MS-624, 1624	(4)
Aromatic Volatiles	As Above	As Above	As above, HCl to pH 2	Without HCl- 7 days with HCl-14 days	40 CFR 136: GC-602 GC/MS-624, 1624	(4)
Acrolein	As Above	As Above	Cool, 4 deg C, 0.008% $Na_2S_2O_3$ if residual Cl, no pH adjustment Cool, 4 deg C, 0.008% $Na_2S_2O_3$ if residual Cl, pH adjustment to 4-5	No pH adjustment - 3 days pH adjustment - 14 days	40 CFR 136: GC-603 GC/MS-624, 1624	(4)
Acrylonitrile	As Above	As Above	Cool, 4 deg C, 0.008% $Na_2S_2O_3$ if residual Cl, pH adjustment to 4-5	14 days	As Above	(4)

*Holding time begins at time of sample collection.